FEBRUARY, 1960

TRAFFIC ENGINEERING

Freeways in the Sixties

Traffic Generator Studies in San Diego

Traffic Safety in Chicago

Movements of Foreign Traffic

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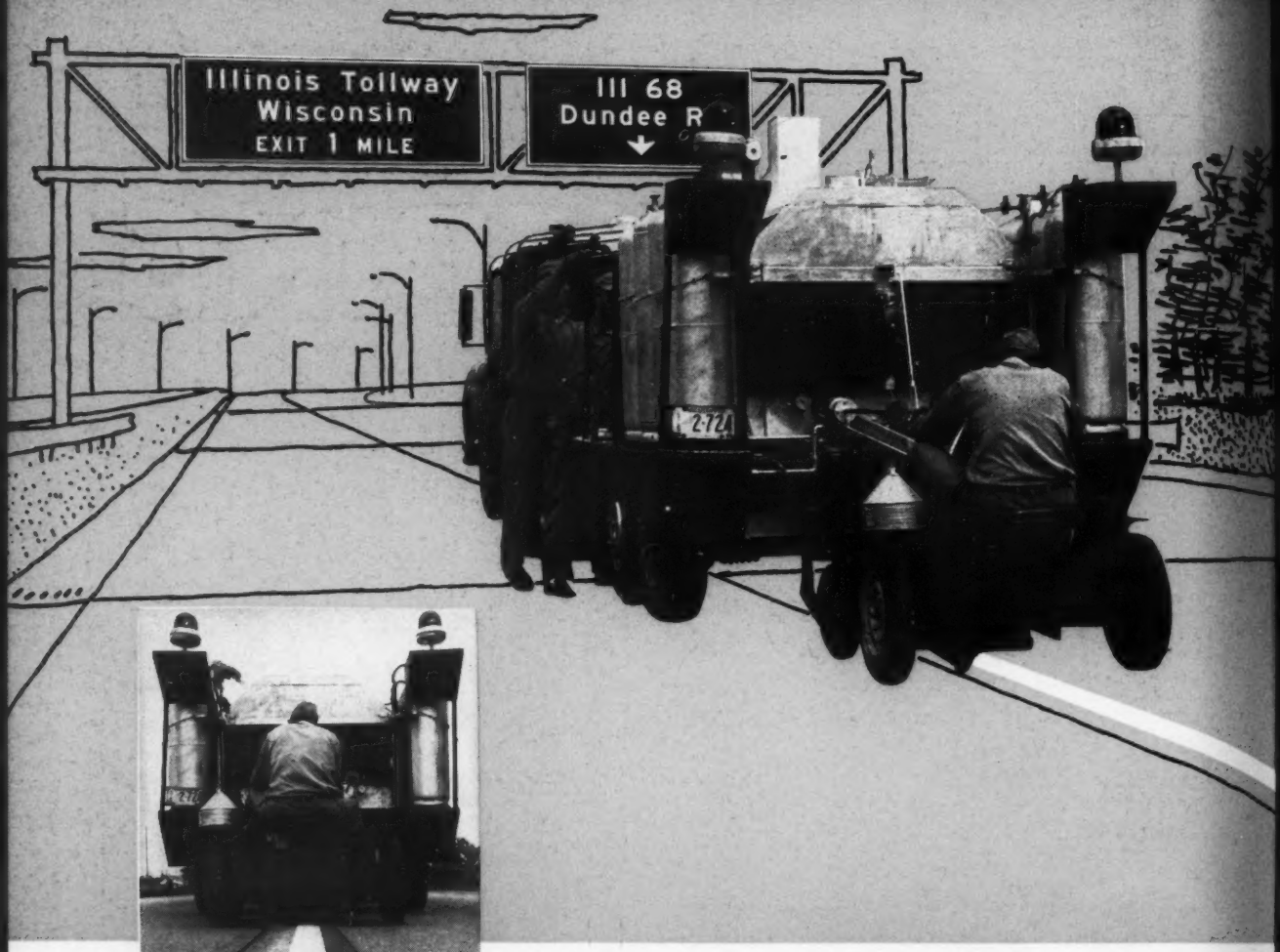

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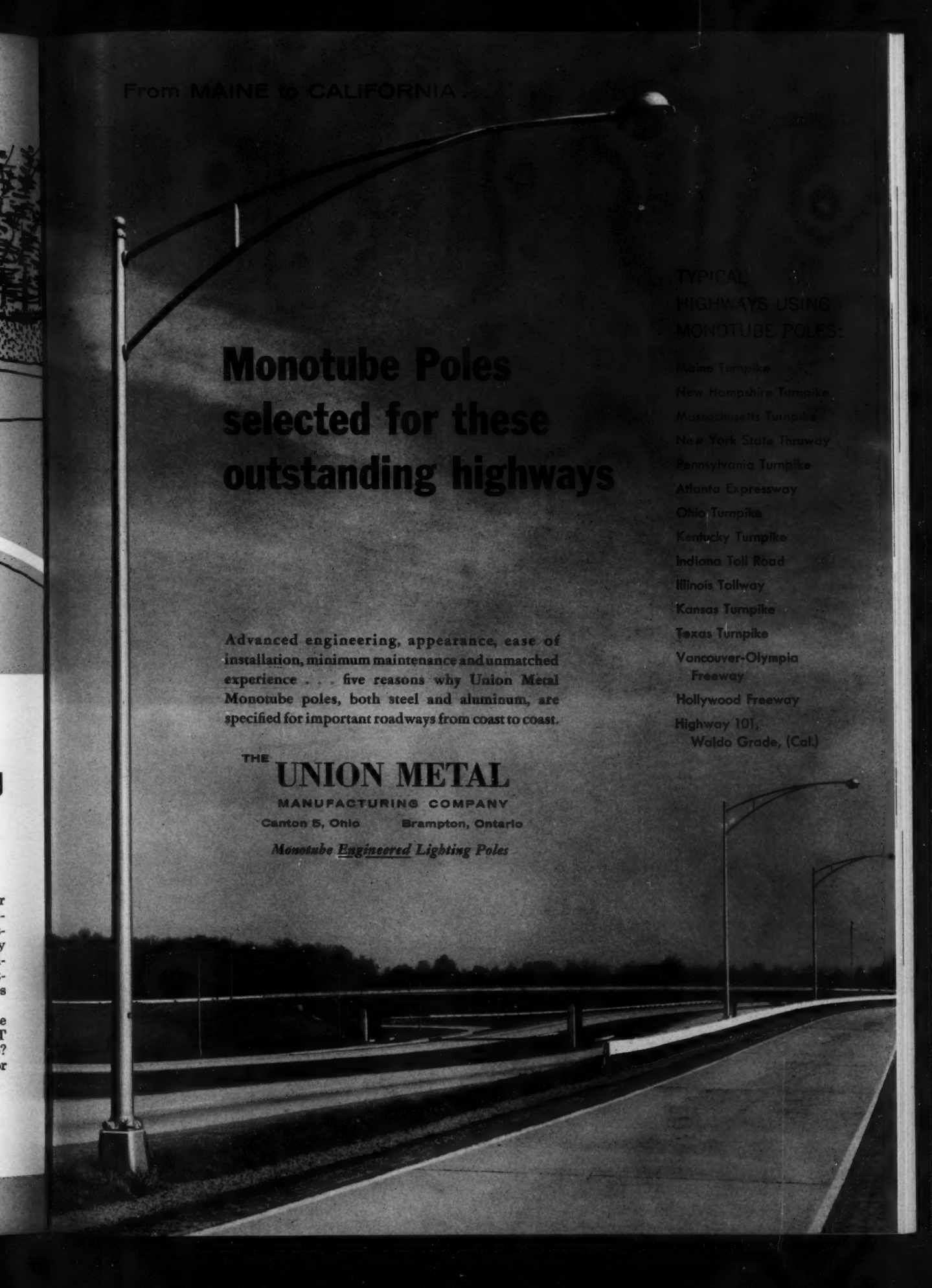

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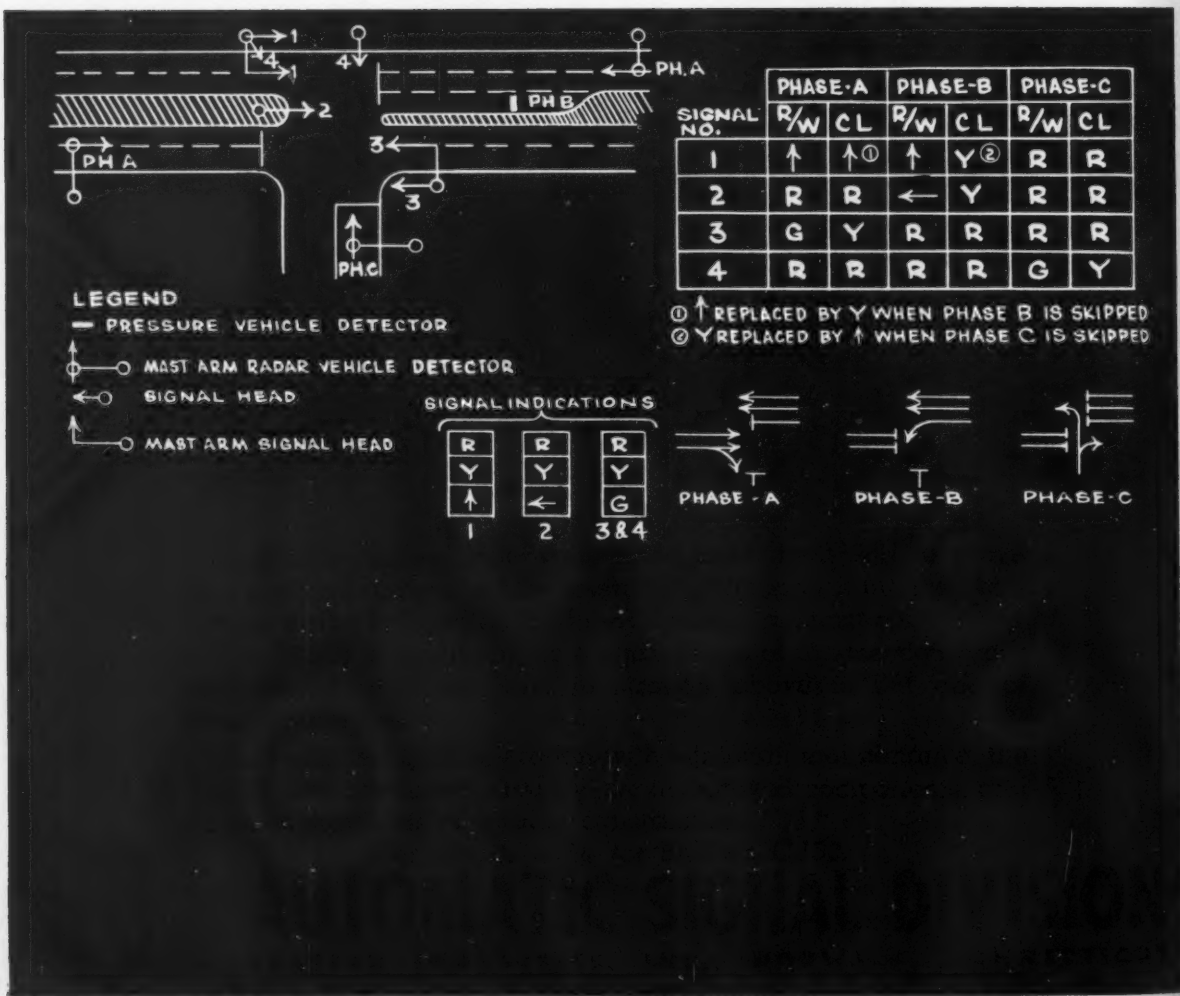

SIGNAL NO.	PHASE-A R/W	PHASE-A CL	PHASE-B R/W	PHASE-B CL	PHASE-C R/W	PHASE-C CL
1	↑	↑①	↑	Y②	R	R
2	R	R	←	Y	R	R
3	G	Y	R	R	R	R
4	R	R	R	R	G	Y

TRAFFIC ENGINEERING

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COVER: BRIDGES ON CHICAGO'S NORTHWEST EXPRESSWAY PASS TEST—Leaves of the twin two-leaf bascule bridges that will carry Northwest Expressway feeder lanes over the north branch of the Chicago River joined in perfect alignment when lowered for the first time. Construction of the bridges, under the supervision of the Cook County Highway Department, was started in September, 1956, and is to be completed during the summer of 1960. Each leaf rises to a height of 125 feet when opened for passage of boats. The bridges and approaches will give direct access from the Northwest Expressway to Chicago's famed near-north side. Cost of bridges and approaches is $8,400,000.
—Photo by Cook County Highway Dept.

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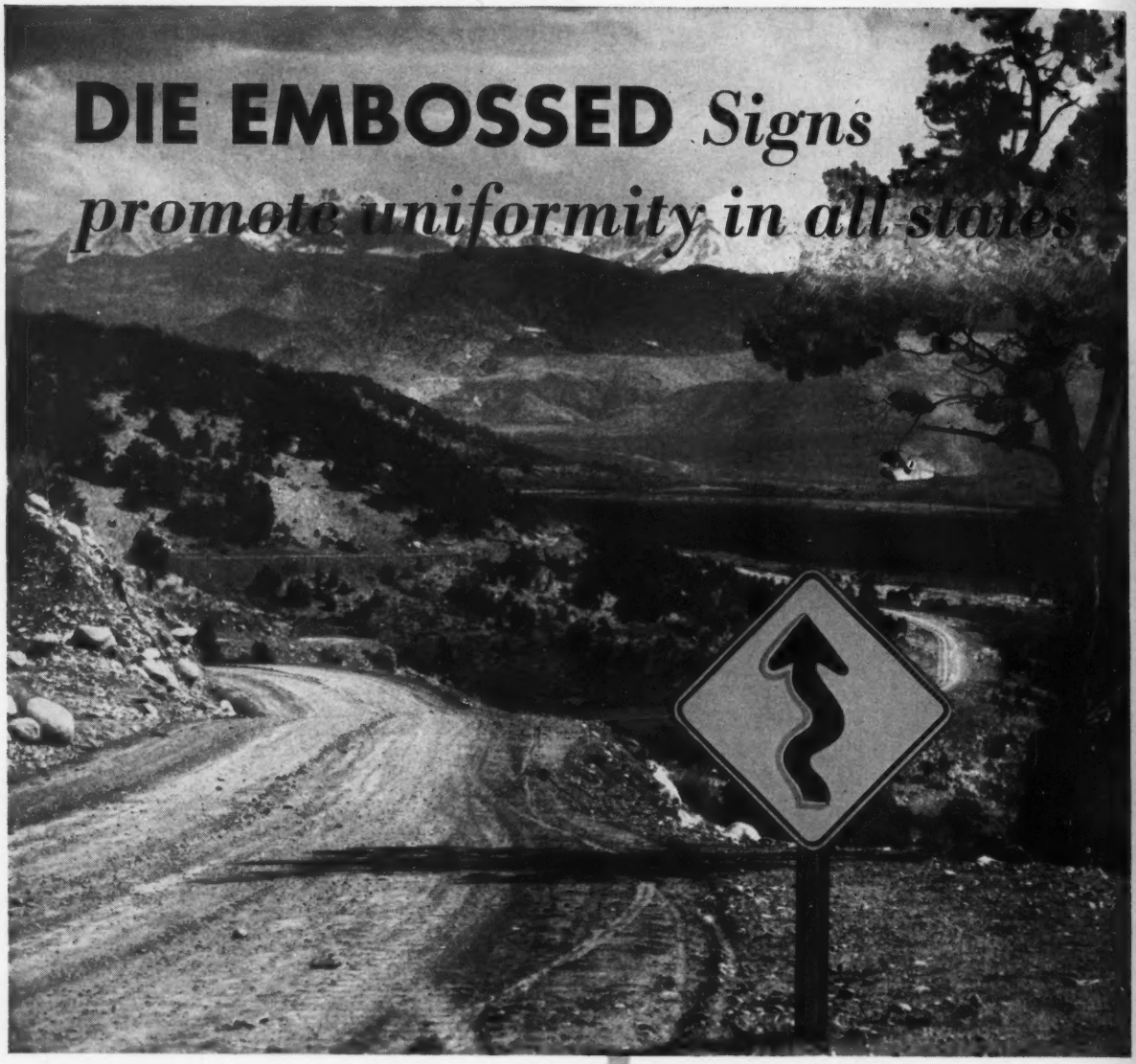

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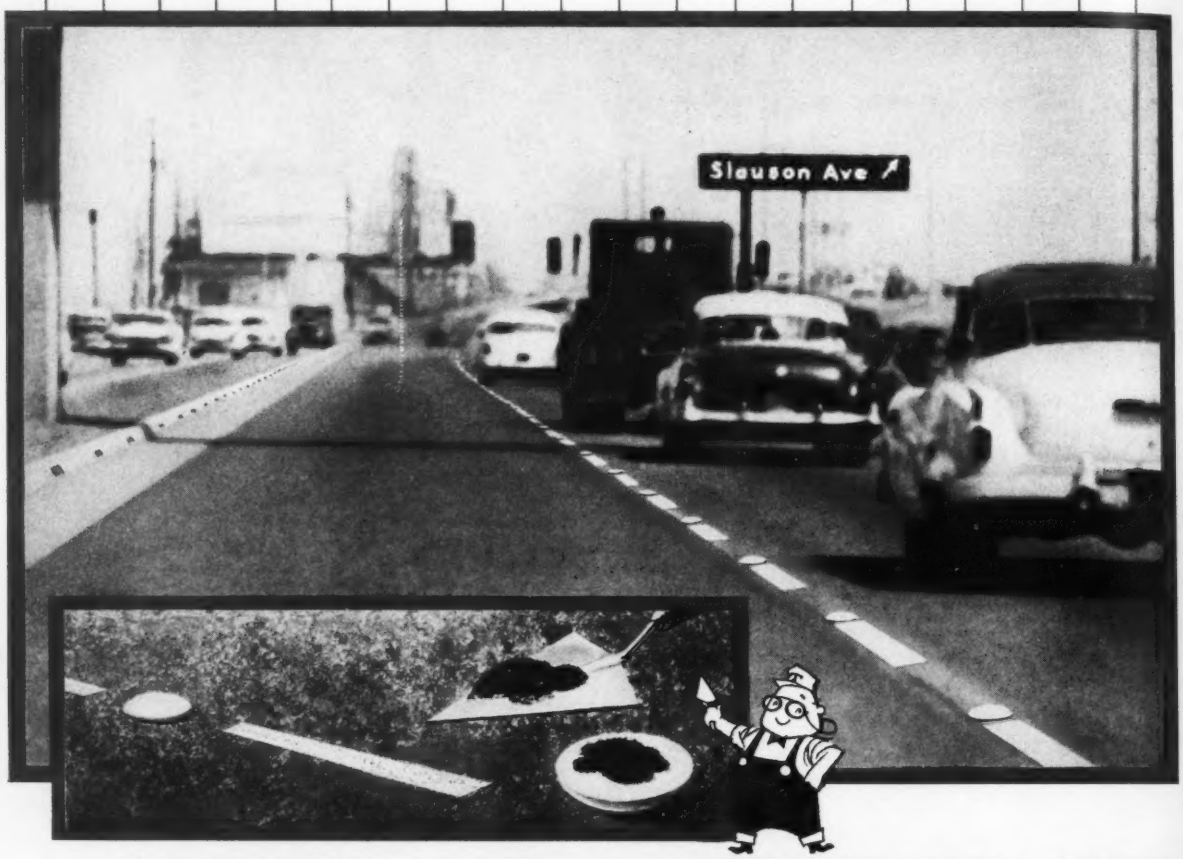

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Frankly Speaking . . .

The subject of mass transportation and the place of mass transit facilities in the expanding urbanization of the country is a frequently and hotly debated subject. In a recent HRB report on needed urban research, an authority in this field makes what appear to be some extremely practical and timely points, which are quoted in full below. Until some of the problems he proposes are answered, little real progress can be made toward a solution of this argument.

THE ROLE OF MASS TRANSIT

MANY PERSONS are inclined to classify mass transit services and their many problems as examples of the pathologies of urban life. One does not have to agree with this view to argue that these services and their role in the circulation systems of urban areas of differing size, density, and economic character merit thorough study. Because of the financial difficulties and operating troubles of many mass transit systems, their place in rush-hour travel in the larger urban areas (even in the most thoroughly motorized ones; for example, Los Angeles and Detroit) is often grossly underestimated. Many of their basic troubles seem to stem largely from three facts: (a) Rush-hour travel is now largely a five-day-per-week phenomenon rather than a six-day one, therefore revenues from it have been drastically reduced but the necessary capacity has not; (b) Furthermore, low-density residential development favors use of the motor car for most travel purposes; and (c) Even in urban areas with severe rush-hour congestion on arterials and other main highways, many of these streets are quite easily traveled in off-peak hours. Hence, mass transport has lost heavily in competition for this travel. In addition, of course, mass transit systems are expected to provide stand-by service for extraordinary demands(for example, those from major athletic contests) and on occasions when storms or other conditions temporarily cut down the use of private automobiles.

Certainly, however, very little in the traffic situations in the most thoroughly motorized cities supports the rather common opinion that mass transit, per se, is obsolete and soon will be only a relic of the past in the United States, except in New York City and perhaps one or two other centers. And perhaps it need hardly be said that little understanding of urban circulation and less sound policy in respect to it are likely to come from constantly viewing the motor car and mass transit as natural enemies locked in a death struggle. In fact, a major—possibly the principal—object of studies of the facilities and problems of circulation in urban areas should be to explore the ways and means by which individual and public transport might most effectively share the job of moving people (and goods) at all times and for all purposes within areas of differing size and character. The ways and means considered would range from such obvious devices as park-and-ride plans and the staggering of work hours in major travel generating districts to more expensive and possibly more questionable schemes, such as the sharing of rights-of-way and some terminal space, and to such controversial proposals as joint financing and administrative arrangements.

In some of the larger urban areas at least, the position of mass transit, particularly of rail commuting, seems to be at or very near a crisis. Apparently many such facilities cannot operate within their present revenues. It is not certain that higher rates will remove their difficulties, at least for very long. They may simply cut down, sooner or later, the volume of traffic on these facilities by encouraging further dispersal of residential development and decentralization of business and industry, as well as by raising the pressures for more express highways. Sorely needed is a factual and analytical basis for evaluating this and related problems, as well as proposals for various forms of subsidy to mass transit. Surely there would be dangers in such proposals—dangers of slack operation, continuance of lines and facilities that ought to be dropped, etc. On the other hand, mass transport is an excellent example of a service that, under prevailing economic and legal practice, simply cannot tap for revenue many of the indirect benefits of its operations. The riders, of course, benefit and pay. But how about the benefits conferred by mass transit lines on property owners, notably those whose land is at or near transit stations or terminals? If the transit agencies could tap only a relatively small proportion of the increase in rental or annual value of such land that is attributable to their services, certainly they would be in better shape financially. They might be considerably better off even if they had to compensate some other land owners whose annual values have been depreciated by the noise and confusion along their lines.

It may be too late to initiate means of tapping the indirect benefits of the older parts of many mass transit systems, but at least the existence of such benefits is a pertinent fact in considering the pros and cons of various forms of subsidy and their alternative of further curtailing these services. Competent studies on the order of magnitude of these benefits, as well as of the gains and losses likely from various possible courses of action in respect to mass transport services, could help substantially in the complex and difficult task of arriving at defensible policies in this whole matter.

(Continued on page 12)

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Highways in the Sixties

By Hon. George H. Fallon
Member of Congress,
Maryland 4th District
Chairman, Subcommittee on Roads
House Committee on Public Works

Presented at the meeting of the Washington Section of the Institute of Traffic Engineers, Washington, D.C., January 13, 1960.

JUDGING BY what I've seen in the newspapers the last few weeks, it would be a breach of etiquette to make any kind of a talk this month without making some reference to the "Soaring Sixties."

We've had quite a rash of articles reviewing the past decade—usually referred to as the "Fabulous Fifties"—and predicting what will come in the next ten years—which some phrase-maker has christened the "Soaring Sixties." It seems certain that our population will soar in the next ten years, and the economists are hopeful that the national economy will soar along with it.

In the field of highway travel, we enter the new decade with high hopes, mainly because we have been able to organize some concerted efforts in the attack on our traffic problems. After a long period of scrambling to keep up with the ever-mounting demands of highway traffic, in which we have typically heaped one make-shift expedient on top of another, we are beginning to reap the benefits of long-range highway construction programming. We are building to meet today's needs with the needs of tomorrow in mind as well.

After three and a half years, the national highway program established by the Federal Aid Highway Act of 1956 is well underway. Largely as a result of this program, the year 1959 was a record year from the standpoint of construction put in place, and 1960, despite cutbacks in certain areas, will be approximately equal to 1959 in construction achievement.

The program undertaken in 1956 consisted of two principal parts:

1. Construction of the 41,000-mile Interstate System, a network of modern, high-standard highways built to connect the principal centers of population and industry. It had been estimated that when completed, the Interstate System will carry at least 20 per cent of all traffic, in terms of vehicle miles.

2. Along with the Interstate System, the national highway program envisions accelerated efforts to bring the Federal-aid primary, secondary and urban highways up to adequate standards. These highways, commonly referred to as ABC roads, must be provided for regardless of the urgency of the Interstate System. Recognizing the importance of a balanced program which provides for the orderly development of the ABC System, I am sponsoring legislation providing for the continuation of this program for the fiscal years 1962 and 1963. This legislation will call for an annual expenditure of at least $952 million for each of the fiscal years. In other words, my bill will provide for a minimum of one billion, eight hundred and fifty million dollars in Federal funds which, when matched on a dollar for dollar basis by the States, will provide a total ABC Program of three billion, seven hundred million dollars for the two-year period.

A good start has been made on both of these programs. Close cooperation between the Federal, State and local governments has expedited construction in many areas. At the present time, the programs are on schedule, although financing difficulties are casting a shadow that indicates some stretchout, particularly with regard to the Interstate Program.

In establishing our long-range goals —looking towards the construction of a highway system adequate for 1975 needs—it was inherent in the program that there would be continuous review of highway needs and highway progress, and that the program be adjusted, if need be, to meet changing needs and changing conditions. The Act of 1956 itself directed the establishment of research projects in two areas—a report on what action the Federal government can take in promoting highway safety, and a comprehensive report, due next year, dealing with the benefits derived from highways by various classes of users and non-users, and the highway costs attributable to each class of highway users.

Various other studies and investigations have been undertaken. Where there is a constructive purpose in mind, such studies can be most valuable to the highway program.

At the present time, the cost aspects of the Interstate program are being scrutinized carefully in several quarters. The 1¢ increase in the Federal gasoline tax which Congress enacted reluctantly last year is a temporary tax, scheduled to expire June 30, 1961. Congress must take up the matter of highway financing again before that date. I think that we would be unanimously in favor of a method of securing adequate highways without adding to the tax burden; unanimously in favor of getting the Interstate highways we need at the least possible cost.

Recently Senator Byrd wrote to the Secretary of Commerce expressing concern that Interstate costs might get out of hand. The Secretary, in his reply, voiced the same concern, and reported briefly on certain activities within the administration which reflect this concern.

I will quote one paragraph from the letter of the Secretary of Commerce which is of particular interest:

"The White House staff, the Bureau of the Budget, and this (Commerce) Department are engaged in a general 'Progress Review' of the Interstate highway program, seeking to determine if the present program emphasis is in line with the orginal intent or if new factors have developed which require modification of the program. We are concentrating on the difficult area of urban construction. Here we are looking both at the responsibility of the 90-10 Interstate program for specified types of construction and the engineering standards and criteria that are being used. Out of this Administration study we hope to gain some insight into the problems you raised in your letter; whether there are extravagances in geometric design and whether some of the costs of specific designs are more properly chargeable to other programs than the Interstate System."

In my estimation, the Administration's concern over the urban part of the Interstate Program can be traced to two factors. First of all, it is obvious that urban highways cost more per mile to build, and therefore, offer a promising target for anyone who is looking for ways of cutting the cost of the Interstate program. It is estimated that about half of the total cost of the Interstate System will be encountered in building urban highways. Secondly, there is a tendency to highly question those sections of the Interstate System which seem to serve local needs to such an extent that no overriding Federal interest is apparent.

Let me say, in all sincerity, that I hope that this study of urban Interstate highways is going to be a thorough one, considering highway needs as well as highway costs. I hope, also, that in considering highway costs, the investigators will consider not only costs per mile, but also costs per vehicle-mile. It is a fact that the most elaborate, high capacity urban expressways are cheaper, per vehicle-mile, than simple, low capacity roads in remote rural areas.

I hope, too, that the study will consider the folly of building high-capacity roads that stop abruptly at city limits and simply dump the traffic into the laps of the urban traffic engineer.

It was the intent of Congress, certainly, in enacting the Federal Aid Highway Act of 1956, to give substantial assistance in relieving urban traffic congestion. A highway program which ignores the urban problem ignores the greatest traffic problem we have today, a problem that offers one of the toughest nuts we will have to crack if we are going to soar in the "Soaring Sixties."

The fact of the matter is that if the urban highways are pulled out of the Interstate program, some other program will have to be devised to fill the need. The alternative is to let the cities strangle.

I do not mean to imply that the Federal-aid highway program will or should solve all urban traffic problems. At best, Federal-aid programs offer only a partial solution. Municipalities must continue to do the best they can to provide the streets and expressways demanded by the increasing traffic burden.

Frankly, I do not think that the combined efforts of all levels of government will ever, in the foreseeable future, be sufficient to give our American cities all of the new highway facilities demanded by our rapidly expanding economy. This means that in addition to building new expressways and other roads in urban areas, maximum utilization of existing facilities is imperative. The responsibility of increasing the capacity of highways and preventing costly traffic jams is largely the responsibility of the traffic engineer. And, to a large extent this responsibility must be met by improved traffic control and modernization of existing streets.

I have seen traffic engineering at work in my home city of Baltimore, where the installation of a system of one-way streets and other improvements greatly relieved traffic congestion at minimum expense to the city. I have seen similar efforts pay off in Washington, D. C. Throughout the country, I know, traffic engineers have done wonders in making it possible for city streets to carry traffic loads far in excess of capacity of the original design. I am certain that through the application of advanced techniques in traffic engineering and greater use of electronic devices, much can be done to alleviate the deplorable traffic conditions in most of our metropolitan areas.

The job ahead constitutes a real challenge for your outstanding Institute of Traffic Engineers, but I am confident through the cooperative efforts of your members ways and means will be found to prevent the impending strangulation of our centers of population.

FRANKLY SPEAKING *(Continued from page 9)*

Incidentally, it is not too late to begin studies of the comparable benefits (indirect) of the newer traffic facilities (for example, expressways). They surely seem to be raising the rental or annual value of very considerable areas of land in urban areas, notably around major interchanges. How substantial are these increases? What other factors, if any, contribute importantly to them? If it seemed wise public policy to tap some part of them for public purposes, could it be done equitably and without too much cost? By what means and methods? What might be the indirect consequences of such a policy?

Admittedly, issues of this kind may seem to some people rather far removed from the "practical problems" of urban traffic and transport. Unless many signs are wrong, however, at least some of these questions are going to seem much more immediate and practical in the near future. Philadelphia already is experimenting, for a limited period of time, with subsidy of some rail commuting lines. So is Boston, apparently in a less imaginative way. And if anything is clear about the persistent problems of urban circulation it is that they will not be substantially ameliorated by minor improvements in design, construction and operation of facilities. Many of these have been made and no one should belittle them or their results. After a few months or years, however, the problems usually are just as severe as they were before—or more so. It is necessary to face up to some complex and difficult questions of public policy. And these policy questions can be defined adequately and considered intelligently only if there is available much more inclusive and reliable knowledge of the kinds just mentioned and some understanding derived from that knowledge.

—Excerpted from Highway Research Board Special Report 52, "A Framework for Urban Studies" for the Committee on Urban Research, by Dr. Coleman Woodbury, Director of Urban Research, University of Wisconsin.

Traffic Generator Studies in San Diego

By Edward M. Hall
Director of Transportation and Traffic Engineering
City of San Diego, California

THE PURPOSE of a transportation system is to serve the people and the land. This basic principle, which underlies the work of the San Diego Metropolitan Area Transportation Study, has led to extensive research of the traffic generating characteristics of various land uses. The identification and isolation of various functional types of land use and the measurement of their traffic generating characteristics has enabled us to develop traffic forecasting for the "Horizon Year."

The horizon year concept is simply a forecast for the complete development of the San Diego Metropolitan Area, or any portion of it, based on the type and density of land use which can at this time be forecast by the planners. Thus, we avoid the pitfall of forecasting for a given point in time, but rather forecast the need for transportation service under a given concept of development. The development may take place today or many years in the future. We hope to be able to provide, at the appropriate time, transportation service required for that development.

The San Diego Metropolitan Area Transportation Study is a continuing study by the City of San Diego in cooperation with the California Division of Highways, the County of San Diego, six other cities, the U.S. Navy, and the San Diego Transit System. The study is coordinated and guided by a small nucleus staff. The nerve center of the Transportation Planning function in San Diego is the Advance Transportation Planning Team, with full-time representation from City and County Planning, City and County Highway Design, and City Traffic Engineering.

These cooperative transportation planning studies have now produced three completed traffic assignments.

TABLE 1
TRAFFIC ASSIGNMENT & STUDY SYSTEM IDENTIFICATION

System & Assignment Designation	System Description	Target Year	Target Population (Millions)
A	Initial System — Modification of Existing Major Street and Highway Plans. Included Freeways, Expressways, and Major Streets and Highways (November 18, 1955)	1952-53	0.6
B	State System — Developed to test techniques and study routes (July 1, 1956)	1952-53	0.6
C	Horizon Year System for SCR 26 Study Included Freeways, Expressways, and Major Streets and Highways (August 30, 1957)	Horizon	2.3
D	SCR 26 Freeway System (Minor modifications of alignment) Study System "C" Major Streets and Highways modified with collectors added as necessary.	1980-90	2.0
E	Exactly same system as D	Horizon	2.5
F	System of Freeways, Expressways, Major Streets and Highways expected to be completed by 1975.	1975	1.5
G	System of Freeways, Expressways, Major Streets and Highways expected to be completed by 1965.	1965	1.0

Further, two additional traffic assignments are now in the final stages of machine processing by the California Division of Highways in Sacramento. Planning and traffic calculations have been completed by the City and County for assignments "F" and "G." Table 1 identifies the seven traffic assignments to the major street and highway system of the San Diego region. The last five assignments use a gravitational formula to distribute the generated trips.

These traffic assignments are being used on a daily basis to assist in two general areas. First, the overall traffic assignments are invaluable tools in the conceptual development of the freeway system to serve a 500 square mile area estimated to hold a horizon year population of 2.5 million. Secondly, traffic assignment is playing an increasingly valuable role in the study of specific portions of the freeway and major street system. Techniques have been developed to isolate any given street or portion of the total street and highway system and study it in detail, yet keep it in proper perspective to the total system.

The traffic generator studies have been based on the following:

A. 1952-53 standard Bureau of Public Roads — Division of Highways Metropolitan Area O-D Study.

B. Intensive study by the City of two large modern subdivision developments.

C. Intensive study by the City of selected industrial, commercial, rec-

A paper prepared for presentation on Panel — Research in Traffic and Transportation at 12th Annual Meeting Western Section Institute of Traffic Engineers, Seattle, Washington, July 30, 1959.

TABLE II

FACTORS TO DEVELOP WEEKDAY ORIGINS

Combinations of the following factors might be made for any specific area or assignment zone and a single, composite factor used in the origin calculations.

I. Residential	
Factor includes commercial origins generated by up to 1% of the gross usable land.	
A. Areas with less than 1.0 Vehicles/D.U.	2.7 origins/D.U.
B. Areas with 1.0 to 1.5 Vehicles/D.U.	3.2 origins/D.U.
C. Areas with over 1.5 Vehicles/D.U.	3.7 origins/D.U.
II. Commercial	
Factor to be applied to the commercial acreage in excess of 1% of the gross usable land.	
A. Mature trend areas and strip development	215 origins/net acre
B. Community and Regional Shopping Centers	275 origins/net acre
III. Central Business District	
A. Central Core	700 origins/net acre
B. Professional District	550 origins/net acre
C. Mixed Commercial District	250 origins/net acre
D. Industrial Areas	180 origins/net acre
	100 origins/net acre
E. Bay Front District	150 origins/net acre
F. Apartment District	200 origins/net acre
G. Schools	60 origins/net acre
IV. Industrial	
A. Aircraft	
1. Without parking	180 origins/net acre
2. With some parking	110 origins/net acre
3. Parking provided	60 origins/net acre
B. Modern Industrial Parks	65 origins/net acre
C. Research Parks	35 origins/net acre
D. Distributional Industrial Areas	85 origins/net acre
E. Bay Front and Shipbuilding	25 origins/net acre
F. Large Warehousing	50 origins/net acre
G. Open Storage and Materials Plants	10 origins/net acre
V. Military	
A. Specific data furnished by Eleventh Naval District	
VI. Major Institutions	
A. Colleges without dormitories	0.7 origins/student
B. High Schools	0.3 origins/student
C. Civic Center	140 origins/net acre
D. Hospitals	
1. Without Parking	2-3 origins/bed
	175 origins/net acre
2. With Parking	4 origins/bed
	70 origins/net acre
VII. Recreational	
Factors for summer *Sunday*. Summer weekday equals about 50% of summer Sunday generation	
A. Ocean Beaches	175 origins/net acre
	0.33 origins/person
B. Still Water Beaches	650 origins/net acre
	0.33 origins/person
C. Developed Parks	10 origins/net acre
D. Rustic Parks	2.5 origins/net acre
E. Lawn Area	20 origins/net acre
F. Motels (with restaurants)	5 origins/unit
G. Golf Courses	200 origins
H. Boat Loadings	1000 origins
I. Boat Slips	1.8 origins/slip

reational, residential and special facilities.

Metropolitan Area O-D

The results of the 1952-53 Origin-Destination Survey were used to discover the traffic generating characteristics of the central business district and certain commercial development. Land use in the central business district ranged from the central retail core to apartment districts and schools. Origins, which were coded to 1/10 mile coordinates in the O-D Survey, were then totaled for each classified land use. Factors of auto and truck origins per net acre were calculated. Net acres are defined as the usable land minus street rights of way.

Strip type commercial development along major arterials was also studied using the 1952-53 O-D data.

Allied Gardens and Clairemont O-D

Origin-Destination surveys, conducted by the City of San Diego in two modern residential developments occurring since 1953 were used to derive the basic residential factors. In this case, detailed analysis of the origin-destination survey was made to obtain origins which took place in purely residential areas. Total origins, divided by total dwelling units gave the generating factors for various types of dwelling units.

Vehicle ownership data of these subdivisions was then compared to vehicle ownership and origins per dwelling unit found in the rest of the metropolitan area. Three general residential area factors were developed.

The generation by elementary schools and minor neighborhood commercial activities have been included in the residential factors. This was done because our studies found it extremely difficult to separate the elementary school traffic and minor neighborhood single store or single gas station generation due to sample size. Further, it is believed to be relatively unimportant in the sense that these were details which could be included in the residential area generation and are in fact a very normal function of neighborhood intrazonal traffic. This example is pointed out to indicate that although extensive research has gone into developing factors in many instances, a much more practical answer can be developed by generalizing under the functional land use philosophy.

Specific Studies

Surveys were made for other selected individual land uses. The tech-

niques of these surveys ranged from simple vehicle count to personal interview. Usually, the net acres of land in use was the common denominator for calculating factors.

One large aircraft plant cooperated by making an employee survey. Mode of travel, travel time, and origin-destination data were part of the survey. Another large aircraft installation, with intensive traffic peaks, was studied by counting and classifying vehicles. Average daily traffic generation and peak hour volumes were obtained at various industrial areas.

Some of the more pleasant traffic generator studies took place in the beautiful parks and beaches of the San Diego area. Varied techniques applied in recreational areas to develop the number of people and vehicles using parks, golf courses, beaches, and boating facilities. Parking turnover data was integrated into these studies.

Factors

A summary of these extensive studies of traffic generators has been developed for use in our actual estimating procedures. Table 2 shows the factors developed for week-day origins.

Application

As is normally done in traffic estimation work, the study area was divided into traffic assignment zones. There are 234 internal zones in traffic assignments D, E, F, and G. To illustrate the use of the traffic generator studies, the estimates for the zones in the central business district of the City of San Diego are presented in Table 3. These estimates were the result of extensive studies of the past and present land uses, as well as careful estimates of future anticipated uses of land within the central business district. To these functional classification of land use were assigned the characteristic traffic generation constants. It is interesting to note that in 1952-53 the O-D Study indicated that there were in the average day 122,500 origins within the central business district. Our forecast gives a horizon year estimate of 187,970 — a growth of 1.53 between 1952 and the horizon year. The area of our central business district is 749 net acres exclusive of street areas. Thus, the 1952-53 origins per net acre were 164 and the expected horizon year density would be 251 origins per net acre per day. The growth factor of the traffic assignment zones in the CBD varied from a low of 1.28 to a high of 2.03.

TABLE III

ESTIMATE OF FUTURE (HORIZON YEAR) AUTO-TRUCK ORIGINS

Central Business District

Area	Total	Traffic Assignment Zone						
		228	229	230	231	232	233	234
Central Core								
Net Acres	75	1		33	34	7		
Origins (@ 700/net ac.)	52,500	700		23,100	23,800	4,900		
Professional District								
Net Acres	34	3		16		15		
Origins (@ 550/net ac.)	18,700	1,650		8,800		8,250		
Mixed Commercial								
Net Acres	210	32	54		9	31	2	82
Origins (@ 250/net ac.)	52,500	*8,000	13,500		2,250	7,750	500	20,500
Industry								
Net Acres	159		74		69		16	
Origins (@ 180/net ac.)	28,620		13,320		12,420		2,880	
Net Acres	70				60		10	
Origins (@ 100/net ac.)	7,000				6,000		1,000	
Bay Front District								
Net Acres	139						61	78
Origins (@ 150/net ac.)	20,850						9,150	11,700
W'front At'tions	2,400						1,600	800
Apartment District								
Net Acres	12	5		7				
Origins (@ 200/net ac.)	2,400	1,000		1,400				
Schools								
Net Acres	50	50						
Origins (@ 60/net ac.)	3,000	3,000						
Total Trip Origins	187,970	14,350	26,820	33,300	44,470	20,900	15,130	33,000

*Includes Hospital

The estimated planning units for a population of 2.5 million and the total origins generated for each is shown in Table 4. You will note that all land has been accounted for, even though it may not directly generate traffic.

A comparison of the estimates for 2.5 and 2.0 million people is included in Table 5. It is interesting to note that although the absolute growth of the CBD continues, the per cent of origins in the CBD gradually reduces. Stated differently, this says that the CBD continues to grow and remain a healthy economic unit, but that its relative proportion of the total trip generation decreases.

The comparisons contained in Table 5 provided considerable reassurance of the estimating techniques. The industrial development for 2.0 million people led the industrial development for 2.5 million in terms of industrial acres per thousand people. This would appear proper in terms of developing growth. The 2.0 million estimates for school origins was 71 per cent of the horizon—2.5 million. Eighty per cent would be norm, or in other words, the schools lagged in their development. Military base developed 113 per cent, industry 90 per cent, and commerce 84 per cent of the horizon year origins.

TABLE 4

PLANNING UNIT AND ORIGIN TOTALS FOR 2.5 MILLION

Trip Generation Element	Planning Unit Totals in Acres		Auto-Truck Origin Totals
Commerce	7,333		1,193,910
Industry	9,016		499,070
Major Institution	2,041		70,663
Schools	6,284		34,700
Park & Recreation	10,637		121,058
Military Bases	15,568		37,470
Agriculture			
Streets	5,209		
Vacant	65		
Other	35,846		35,802
Non-Residential Acreage	91,999		
Residential Acreage	218,181		
Population	2,495,265		
Dwelling Units	724,260		2,289,873
		Total Origins	4,232,546

TABLE 5

SUMMARY AND COMPARISON OF ESTIMATES

For 2.5 and 2.0 Million

	Assignment "E" 2.5 Million	Assignment "D" 2.0 Million
Population	2,495,265	2,045,542
Dwelling Units	724,260	589,924
Origins (Internal)	4,232,546	3,531,336
Origins per Person	1.70	1.72
Origins per Dwelling Unit	5.84	5.98
Per cent of Origins that are in the C.B.D.	4.44%	4.96%
Persons per Dwelling Unit	3.45	3.47
Industrial Acres/1000 Persons	3.61	3.99
Commercial Acres/1000 Persons	2.94	2.97

The population and dwelling units were at or near the 80 per cent target.

Summary

The traffic generator studies are built on broad research and have been the basic tool in the development of traffic forecasts based on sound lane use estimates by the planning departments. Traffic assignment has been one of the tools used to study and develop freeway and major street systems.

Most of the traffic generation constants have been related to net acres of land. It might be desirable to relate traffic generation to such items as square feet of industrial floor space or to the net usable square feet of display area in commercial developments or to employees. Further research should be conducted to develop the relative importance of such refinements. In San Diego, preliminary studies have indicated that the origins per net acre base has produced practical answers by simple, rapid, usable techniques.

One new concept in regard to the use of traffic generation estimates is beginning to bear fruit in San Diego. The traffic generation estimates for each traffic assignment zone for each target year have been placed on a large wall map. Further, the 1952-53 O-D origins have been placed on this same map. Thus, we have a tremendously valuable tool for visualizing the balance of the concept of development of the entire San Diego region. We feel that through cooperative studies with planners, we are on the threshold of developing an extremely useful quantitative tool for evaluating land use plans.

Coming Events

February 18-20—NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS—

Winter Meeting, Broadview Hotel, Wichita, Kan. Contact: Kenneth E. Trombley, NSPE, 2029 K Street, NW, Washington 6, D.C.

February 23-25 — ILLINOIS HIGHWAY ENGINEERING CONFERENCE—

46th Annual Meeting, Urbana, Ill. Contact: John W. Hutchinson, 304 Civil Engineering Hall, Urbana, Ill.

February 25, 26 — ILLINOIS TRAFFIC ENGINEERING CONFERENCE —

12th Annual Meeting, Urbana, Ill. Contact: John E. Baerwald, 401 Civil Engineering Hall, Urbana, Ill.

March 6-8—SOUTHERN SAFETY CONFERENCE & EXPOSITION—

Joint Headquarters Robert Meyer and George Washington Hotels, Jacksonville, Florida. Contact: W. L. Groth, P.O. Box 8927, Richmond, Va.

March 23-25 — NORTHWEST HIGHWAY ENGINEERING CONFERENCE—

Oregon State College campus, Salem, Oregon. A combination of the former Northwest Traffic Engineering Conference and the Northwest Road Building Conference. Contact: J. Al. Head, Assistant Traffic Engineer, Oregon State Highway Department, Salem, Ore.

May 10-12 — NATIONAL HIGHWAY USERS CONFERENCE—

Eighth Highway Transportation Congress, Mayflower Hotel, Washington, D.C. Contact: Arthur C. Butler, NHUC, National Press Building, Washington 4, D.C.

June 8-11—NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS—

Annual Meeting, Statler Hotel, Boston, Mass. Contact: Kenneth E. Trombley, NSPE, 2029 K Street, NW, Washington 6, D.C.

September 12-16 — INSTITUTE OF TRAFFIC ENGINEERS—

30th Annual Meeting, Edgewater Beach Hotel, Chicago, Ill. Contact: ITE, 2029 K St. N.W., Washington 6, D. C.

September 26-30—FIFTH INTERNATIONAL TRAFFIC STUDY WEEK—

Nice, France. Contact: M. H. Perlowski, Secretary to the OTA/PIARC/IRF Joint Committee, 32 Chesham Place, London S.W.1, England.

Traffic Safety in Chicago

By Charles S. Michalski
Traffic Engineer
Citizens Traffic Safety Board of Metropolitan Chicago

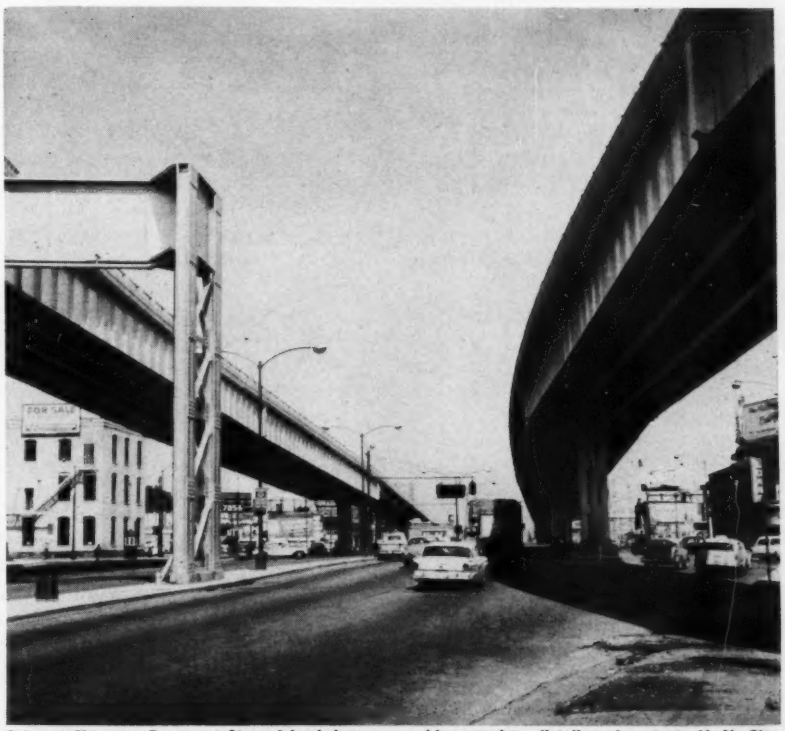
AMONG LARGE CITIES, (population of 1,000,000 or more) Chicago is the only city in which traffic fatalities have declined during each of the past seven years. The 300 deaths recorded in 1959 is the lowest toll since 1916 when there were 303 deaths and only 65,000 vehicles registered in the city. Beginning in 1953, the current downward trend in traffic fatalities has persisted in face of a 16 per cent increase in vehicle ownership in the city and a 65 per cent increase in adjacent suburban areas. Latest reports indicate nearly 1,000,000 vehicles registered in the city and 600,000 in suburban areas.

As recently as 1954, Chicago had the worst death rate (deaths per 10,000 registered vehicles) among large cities. In 1956 Chicago rose to a tie for second place and has remained in that position through 1959.

Year	Traffic Fatalities	*Death Rate
1952	458	5.3
1953	440	4.9
1954	416	4.4
1955	389	3.9
1956	364	3.6
1957	326	3.2
1958	311	3.1
1959	300	3.0

*Deaths per 10,000 vehicles as determined by National Safety Council.

Like other large American cities, Chicago experienced a steady rise in traffic deaths during early years of the automobile era. The peak was reached in 1934, when 986 lives were lost in traffic accidents. As the effects of the great depression wore off and motor vehicles became more numerous, traffic deaths diminished. The decline continued into World War II years through 1943, when 383 traffic deaths occurred. This was the smallest loss of lives in traffic since 1917. However, even before hostilities ceased, traffic fatalities began to mount and by 1947 reached a post-war high of 505.



Calumet Skyway—Ramps at Stony Island Avenue provide motorists all-toll-road route to N. Y. City.

The purpose of this writing is to describe briefly the actions taken by city authorities and civic groups to reverse the trend in traffic deaths, with particular attention directed to changes that have taken place since 1952 when Chicago was host to the 22nd Annual Meeting of the Institute of Traffic Engineers.

A review of the record achieved by the city of Chicago in its fight on traffic fatalities indicates clearly that it is the result of expanded and intensified activity in all of the three familiar "E's"—education, enforcement and engineering. Once notorious as the most dangerous city in the country, Chicago has won several awards in the Annual Inventory of Traffic Safety Activities conducted by the National Safety Council. In 1954, Chicago placed first among large cities for highest score on its entire safety program. Awards of merit were won in 1956 and 1958. Since 1952, the city has been honored four times by the Institute of Traffic Engineers for outstanding performance in traffic engineering.

The current traffic safety program had its beginning in 1947, when city fathers, alarmed by the rapidly rising post-war traffic toll, engaged the International Association of Chiefs of Police Traffic Division to conduct a

Congress Expressway—High-speed two-car trains are used in rapid transit service during off-peak hours.

survey and make recommendations for a sound traffic safety program. On the basis of findings of this survey, the traffic division of the police department was expanded and reorganized, an accident investigation unit was established, arrests for violations of traffic regulations were increased, enforcement was directed more selectively at those violations known to be causing accidents, chemical tests for intoxication were adopted, and special training was given police personnel on traffic subjects. In addition, traffic court procedures were simplified and improved, traffic engineering was expanded, and the city traffic code was revised to conform with the model traffic ordinance.

Reaction to changes was immediate. Traffic fatalities declined for four consecutive years, from 505 in 1947 to 398 in 1950. However, with vehicle travel increasing at an unprecedented rate, the program began to falter, and the upward trend in deaths resumed. It became evident that the program needed bolstering.

In 1951 when the definite need for citizen backing and participation began to be acutely felt, business and industry leaders met at one large meeting and pledged to provide citizen participation in the program. The Citizens Traffic Safety Board of Metropolitan Chicago, which was the outgrowth of this meeting, immediately began to direct efforts toward obtaining and building public support. Every medium, including newspapers, radio and television, was enlisted to inform Chicagoans of dangerous conditions in the streets. Pamphlets, flyers, posters, decals and other materials were distributed by the millions.

Inasmuch as pedestrians were accounting for nearly two-thirds of the traffic deaths, it was only natural that there would be a great deal of emphasis on pedestrian safety. Particular attention was given to the older pedestrians whose deaths annually amounted to 70 per cent of the pedestrian toll.

The educational campaign was concurrent with improvements in street lighting, increases in channelization, pavement markings and traffic control devices as well as intensification of enforcement of laws relative to pedestrian safety. While it is not feasible to determine how effective each of the pedestrian safety programs was, the record speaks eloquently for the entire program. In 1959 there were 174 pedestrian deaths as compared with 275 in 1952.

In addition to pedestrian safety, the public was being sold on the need for a continuing high level of enforcement of traffic laws. Newspapers, historically critical of enforcement practices in the past, gave invaluable aid, not only in their news sections but also in editorial pages.

A driver improvement school was established by the municipal court in 1956. The original purpose of the school was to provide orientation for traffic law violators who, in the opinion of traffic judges, could profit from lectures on rules of the road and good driving practices. However, the school has become popular with volunteers (non-violators) who currently account for 70 per cent of the attendance. In 1959 the total attendance was 15,000. Classes are held at the traffic court center as well as in 3 outlying high schools. Lecturers are officers of the Public Safety Education Bureau of the Police Department. Some of the lectures are given in Polish and Spanish for the benefit of large immigrant population.

While Chicago is one of the first cities to recognize the importance of traffic engineering, sufficient funds were seldom available to give proper attention to the many traffic problems. Since 1952, the Bureau of Street Traffic has experienced phenomenal expansion in personnel, facilities and responsibili-

Pavement markings aid motorists at irregular intersection complicated by railroad crossing.

Broadway before relighting.

Broadway after relighting — Note mountable median is of type widely used in Chicago.

ties. In 1951, the budget of the Chicago Bureau of Street Traffic was less than 1½ million dollars. During the past seven years, the budget was steadily increased to 4 million dollars in 1959.

Although a great deal of attention is given to spot problems, many of the Bureau's undertakings are planned for city-wide application. The program for channelization of arterial streets is an outstanding example. Since the close of World War II, change from streetcars to buses was completed. The major portion of the 600 miles of streets, formerly traveled by streetcars, is being transformed into an efficient traffic-carrying network by construction of medians, left-turn bays, and intersection approach widenings.

In addition to geometric improvements of streets, the city has undertaken a program of through-lane overpasses at critically congested intersections. Unlike grade separations, these overpasses require little or no taking of abutting properties and may be constructed economically. The first completed through-lane overpass, located at the intersection of Archer and Ashland Avenues, has proven to be an effective device in reducing congestion and accidents.

In the field of traffic control, the city of Chicago continues to pioneer. It was the first city to adopt radio-controlled supervision of traffic signals. Radio is also being used to transmit tone signals to indicate to maintenance personnel base time for timing any or all of the city's 1,800 fixed-time controlled intersections. In connection with the large-scale program for left-turn bays, special signal indications and sequences are being provided for efficient and safe movement of traffic. Use of pedestrian signals is being expanded. A special installation is currently under observation at the world's busiest corner, State and Madison Streets.

Pavement markings are increasing each year in quantity and quality. In 1959, the city used 47,000 gallons of paint, approximately twenty times as much as in 1950. Marked crosswalks are currently maintained at 6,000 intersections and 850 miles of centerlines and lane lines are applied.

In the fall of 1958, the Traffic Engineering Center was placed in operation. The center, whose telephone number was well publicized, gives Chicagoans a place to report all inoperative traffic control devices, hazardous street conditions. Calls received from citizens are relayed by radio to appropriate mobile repair crews for speedy action. Over 100 repair vehicles are equipped with two-way radio.

The Bureau of Street Traffic operates a fleet of radio-dispatched mobile units which can make emergency sign replacements and set up detours. Information regarding traffic conditions as affected by accidents, fires, and other emergencies is transmitted from mobile units to the base station. Newspaper, radio and television editors are alerted so that they may warn their readers and listeners about unusual traffic conditions.

At the end of 1959, over 3,400 miles of the city's 3,900 miles of streets and boulevards had been relighted in conformity with best known practice. The relighting program, undertaken after the end of World War II, has cost over $100,000,000 to date, of which $80,000,000 was raised by bond issue. In a recent referendum, voters approved a $25,000,000 bond issue to continue the program. Studies show that on thoroughfares that have been relighted since 1952 the number of night-time traffic fatalities has been reduced by 48 per cent.

Expressway construction has been proceeding at a rapid rate in the Chicago area. Scheduled for completion late in the summer of this year is the Northwest Expressway. Using this expressway, motorists will be able to

(Continued on page 54)

CHICAGO
will be host to the
30th Annual Meeting of the Institute of Traffic Engineers
SEPTEMBER 12-16, 1960
Edgewater Beach Hotel

Plan now to attend this meeting!

Famed Michigan Avenue—Note use of pavement markings to delineate left turn lane.

Impressions of European Traffic

—A feature story based upon a U. S. traffic engineer's trip abroad

THE CLOGGING of streets and highways in Europe has reached the point where serious efforts are being made to modernize antiquated traffic control systems.

This is the observation of Henry A. Barnes, Baltimore director of traffic and transit, upon returning from a two-month inspection and lecture tour of England and the Continent. His trip was sponsored by the International Road Federation.

An indication of Europe's heightened interest in licking traffic problems is the forthcoming visit to the United States of Ernest Marples, Britain's Minister of Transport. He will consult government specialists in Washington, tour our toll roads and observe the latest examples of highway and bridge construction here.

Returning Barnes' visit to England, he will also spend some time in Baltimore, getting a briefing on how that city handles traffic.

Outside European cities, Barnes says, highway planning and design and construction are on a par — in some cases better—than in the United States. But the cities themselves are "forgotten orphans." For instance, he points out, the German autobahns are "terrific" but they unfortunately stop at the edge of the cities, doing nothing to ease the traffic tangle in urban areas.

Traffic in Rome, Paris and London is described as an "unbelievable mess."

"And there's no need for it," Barnes continues. "There are so many things that could be done without waiting for new construction projects. These places have no arterial street systems and modern traffic controls simply haven't been applied."

Adding to the confusion, in his opinion, is the fact that European drivers are generally undisciplined and lane markings are conspicuous by their absence.

Turning specifically to some of the points he visited, the Baltimore official says London is hampered by an absolute lack of parking control and regulation of turning movements, plus too few street markings. Another source of trouble, he adds, is that the 42 communities comprising London have local autonomy over traffic regulations, ruling out a coordinated system that makes sense. However, a bill is being prepared that would eliminate this hodge-podge by setting up central traffic controls.

Barnes says London traffic is worse than anywhere in the U.S. and "would not be tolerated for two minutes here." He suggests that a good traffic engineer with a fund of $7 million annually for the next five years could produce "amazing results" — even though he might end up as the city's "most unpopular man."

"Tremendous" was Barnes' characterization of the Birmingham Redevelopment Project. He says it's a perfect example of meshing urban redevelopment with sensible highway planning. Featuring the project, which will take ten years to complete, is a tunnel burrowing under the central business district. It will enable trucks to handle merchandise of downtown establishments underground, thus easing surface congestion.

Traffic conditions in Paris are about the worst imaginable, Barnes asserts, and a big assist must go to Parisian motorists.

"To see an accident in this city is like watching a Mack Sennet comedy. The drivers jump out of their cars, or if one doesn't stop the other jumps out and chases him down the street on foot." Arm-waving and screaming follow for several minutes, attracting a large crowd and, of course, creating a king-size traffic jam.

"Before the police arrive the persons actually involved exchange names or cards, shake hands and drive off. Those not involved aren't so easily discouraged. They remain for another 20 minutes and argue out the blame."

Almost no Parisian streets are marked with paint. Inquiring the reason, the Baltimorean was told that drivers would never heed them.

"I pointed out that they couldn't be certain of this until they painted in some lanes and tested reaction," Barnes says.

Whether it was due to his persuasiveness or not, the French were installing lane lines on the Champs Elysees before Barnes left town—and with good results. Previously wild-weaving traffic began to take on a semblance of order.

The Baltimorean was impressed with the traffic control system around the Arch of Triumph, calling it the best he saw in Europe. The system controls an intersection having approach streets from 12 directions and handling 150,000 vehicles every 24 hours — plus a steady stream of motorpeds and bikes.

In touring Scandinavia Barnes was struck by the cleanliness of Stockholm. "All of the traffic signs sparkle and, unlike ours, are easily understood. The signals are bright and the lenses clean. And there are no billboards cluttering up the highways."

He says there is only one no-parking notation at the beginning of a block and if a driver misses it "he is given sympathy and a ticket, which he pays."

Many of the tickets are doled out by women, who not only service parking meters but direct traffic. Barnes him-

self was almost jailed by one of the ladies when he attempted to inspect a signal cabinet at a busy Stockholm intersection.

Like Sweden, Barnes states, Denmark is doing a good job of highway planning but is restricted by limited funds. The Danish government keeps traffic volume down by levying such steep automobile taxes — 100 per cent and over of cost — that ownership is discouraged.

Denmark uses a minimum of paint in controlling traffic "but is beginning to realize the value of marking streets, and probably more of this will be done in the future."

The congestion in Rome is attributed in large part to undisciplined driving practices. For instance, motorists make U turns wherever they wish and park or double-park the same way.

"I think the people there enjoy suffering a little," Barnes comments. "They brag about surviving traffic for another day."

However, lack of effective traffic controls contributes to driver errancy. According to Barnes, pavement markings are scanty, fines are limited to parking violations, and the police are inclined to retard vehicle flow rather than to speed it up.

In Rome there are no pavement markings except 100 feet or so back from intersections. And the traffic signals are all located on the near side of the street "in such a way that if you stop at the normal stopping point you can't see them." Consequently, Barnes continues, "you don't know the light has changed until the second or third driver behind you blows his horn."

He thinks Italian cities could double their traffic capacity by marking streets and installing electronic signaling.

Biggest problem in Germany, Barnes says, is that cities have to go it alone. The federal government builds the autobahns and the states the major highways, leaving the urban centers to their own devices. The cities make an effort, but are plagued by divided authority and shortages of trained engineers and money.

Hamburg has a relatively small number of vehicles in relation to its population, but Barnes found there one of the severest traffic crushes he encountered in Europe. In peak hours, he says, "traffic backs up for blocks and it sometimes takes 45 minutes to go a mile or two."

Barnes found a lot of construction work going on in Germany, with excellent use being made of pre-stressed concrete as a substitute for hard-to-get steel. Some highways, however, get stalled for two or three years in front of a home or business because German officials do not have the quick condemnation power enjoyed in this country to secure a right of way. In Germany "quick-take" is regarded as somehow undemocratic — and so is our practice of towing away illegally parked autos.

Barnes says Switzerland's problem is opposite to that of most of Europe. There the political pressure is to build freeways in the city first.

"But the cities don't need them," he remarks. "The trouble is getting between cities over the mountainous country. Why build new streets when the cities aren't fully utilizing the existing ones?"

Irritated by slow progress, Swiss voters a year ago empowered the federal government to build all inter-city highways and their urban connecting links. Previously, all roads were put up by the cantons.

Under the new system the federal government finances 80 per cent of the non-urban routes and 60 per cent of the urban.

Barnes saw no particular traffic problem in Zurich or Berne, adding that there are few signals, minimum control over vehicle movements "and pedestrians are strictly on their own."

Zurich is planning a master freeway costing about $200 million and it will include a more than mile-long tunnel under the heart of the city.

"The ironic thing about this grand plan," Barnes observes, "is that at present there is no right of way law in the city—whoever gets there first has the right of way unless the other fellow has a witness and you don't." Nor is there a legal ban against parking on the sidewalk, parking on the wrong side of the street, or double-parking.

Spain has no traffic worries except for the central business district of Madrid, Barnes says, and even there the traffic hardly warrants one signal. The country has one car for every 200 people—lowest ratio in Europe. Ox-carts and donkeys are still a common sight on the road.

Highway work is still done predominantly by muscle rather than mechanization, due to Spain's shortage of dollars to buy modern road-building equipment and the necessity of spreading employment among as many workers as possible.

Summing up, Barnes declares "there is not a problem in Europe that can't be licked" with a bit of effort and a positive attitude on the part of responsible traffic officials. He believes his tour helped in instructing on modern methods of traffic regulation, but adds that the suggestions he made were palliatives and not ultimate solutions.

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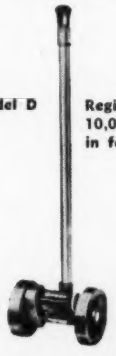

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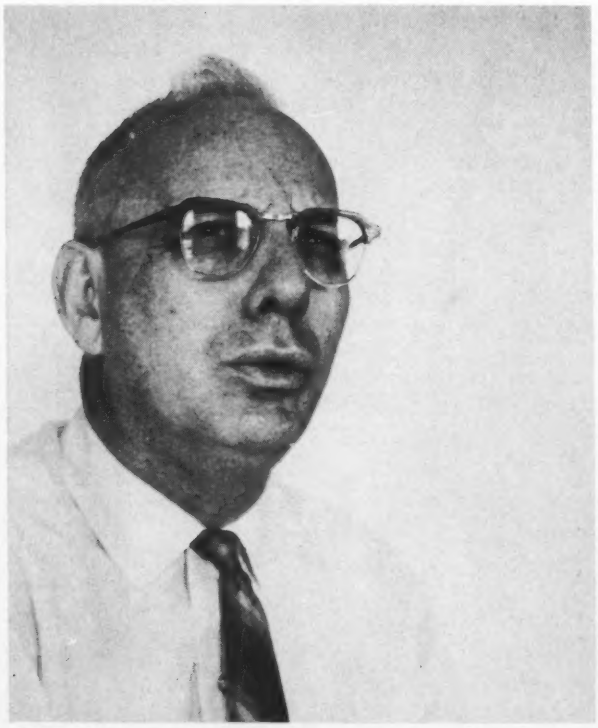
Henry Barnes Answers Questi

How are they building the autobahns in Germany?

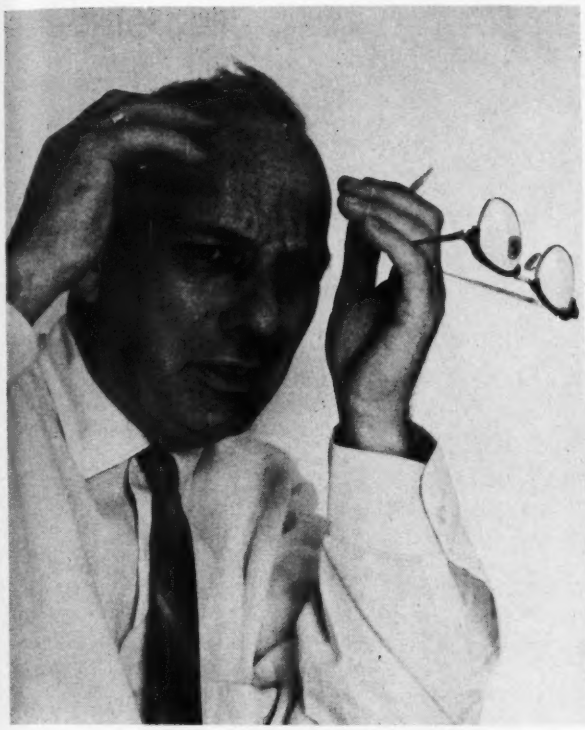
Did you like driving to the left in Sweden?



What about the 100% tax on vehicles in Denmark?

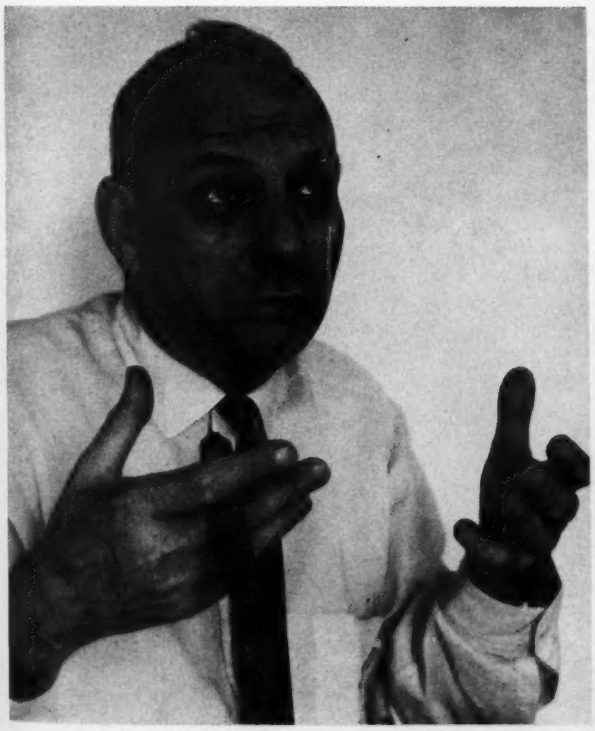
Can London solve its traffic problems?

Questions on European Traffic

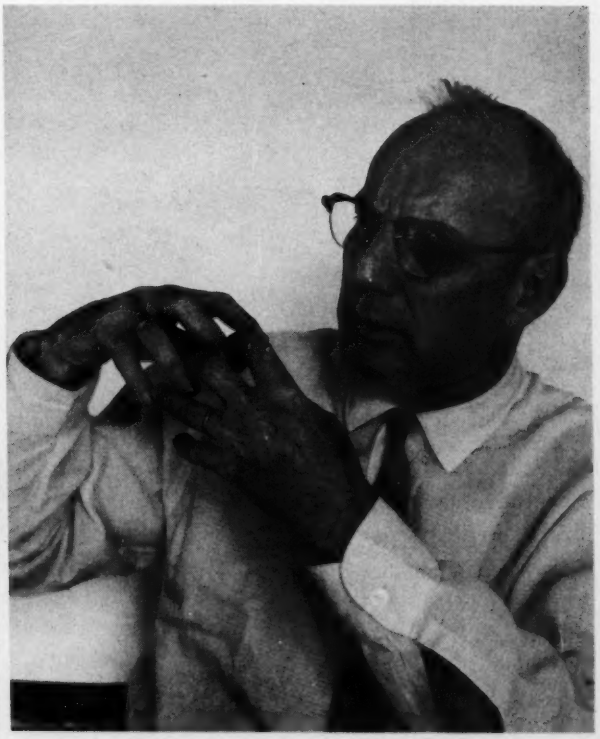


Would you like to be Paris' traffic director?

Did East Berlin appeal to you?



Can Hamburg get out from under?



How does Rome's traffic move?

Traffic News

Sponsors Named for Engineers Week

Thirteen leading engineering figures will act as sponsors for the 1960 National Engineers' Week, February 21-27.

They are: Wernher von Braun, director, Development Operations Division, Army Ballistic Missile Agency; Allen B. DuMont, chairman of the board, Allen B. DuMont Laboratories, Inc.; T. Keith Glennan, president-on-leave, Case Institute of Technology, and administrator, National Aeronautics & Space Administration; James R. Killian, Jr., chairman of the Corporation, Massachusetts Institute of Technology; Clarence H. Linder, vice president, General Electric Company; Granville M. Read, chief engineer, E. I. du Pont de Nemours and Company; Royal W. Sorensen, California Institute of Technology; Philip Sporn, president, American Electric Power Company; David B. Steinman, consulting engineer; Bertram D. Tallamy, Federal Highway Administrator; Charles Allen Thomas, president, Monsanto Chemical Company; John L. Burns, president, Radio Corporation of America, and A. V. Wiebel, president, Tennessee Coal & Iron Division, United States Steel Corporation.

The theme for the 1960 observance is "Engineerings' Great Challenge . . . The 1960's." The Week is under the general sponsorship of the 52,000-member National Society of Professional Engineers.

Expressway Questions For Michigan to be Explored

Michigan's public officials concerned with traffic engineering, enforcement, community planning, and those involved with providing service and information to the motorists, are already anticipating the new problems to be posed by Michigan's new highways.

To assist these groups of officials and representatives in becoming more aware of the problems and questions which the new highways will bring, as well as to provide some possible answers, Michigan State University's Highway Traffic Safety Center will hold a three-day seminar on "Michigan Urban and Rural Expressways," starting February 29, 1960. The seminar will be conducted at Kellogg Center on the University's campus in East Lansing.

This will be the first such meeting held in the nation on a state-wide basis and will be patterned after the regional seminars conducted by the Institute of Traffic Engineers.

The year 1960 may be described as the beginning of a new highway transportation era for Michigan drivers. Within the next two years, about a thousand miles of new, controlled access expressways will be in operation. Within the next decade, Michigan's present highway building program, which calls for more than two thousand miles of expressway construction, will connect all major Michigan cities and will service more than two-thirds of Michigan's people and 90 per cent of its industries. At the southern border of the state, this new transportation facility will be linked up with the major transcontinental travel routes and in the north it will provide easy access to the heart of Michigan's vacation and tourist regions.

Attending the Michigan seminar will be state, county, city and local officials and representatives of government agencies concerned with highway engineering, traffic enforcement, planning, administration, industries and services involving the motoring public.

The program will be presented by Highway Traffic Safety Center staff, state officials and out-of-state authorities. Subjects to be discussed will include problems of the drivers, problems of the various official agencies involved in highway operations and problems of the communities affected by the new roads.

Cooperating with the HTSC in planning and presenting the seminar are the Michigan Highway Department, Michigan State Police, Michigan Association of Chiefs of Police, Michigan Sheriffs' Association, the Michigan Municipal League, the County Road Association of Michigan, Automobile Club of Michigan, the U. S. Bureau of Public Roads, and Institute of Traffic Engineers.

Detroit Starts Major Study of TV on Freeways

In a unique research project, Detroit traffic engineers are cooperating with state and national highway departments in placing a three-and-a-half mile stretch of mid-town expressway under televised traffic control, using 14 TV cameras.

The experimental TV hook-up, expected to begin operation next spring, will tie in with a master control panel at a central monitoring point. Here an observer can push buttons to close off entrance ramps, reduce lane speed, summon necessary emergency aid and guide traffic past congested areas.

The project is the "brainchild" of Alger F. Malo, Detroit Director of Streets and Traffic, who points out that limited expressway mileage now in operation is doing an outstanding job of providing safe, convenient travel.

'Expressways Are Over-Loaded'

"But expressways in nearly all major cities are heavily over-loaded, particularly during morning and evening rush-hours," he states. "In Detroit, lanes designed for a maximum capacity of 1,500 vehicles an hour frequently have to handle 2,000 or more.

"A minor accident during rush hours will back traffic up for several miles in just three or four minutes. By the time police can be summoned, entrance ramps and feeder streets are clogged with vehicles. This indicates a need for a detection device that will spot trouble the instant it develops. Television appears to be the answer."

Weather-Proof Cameras

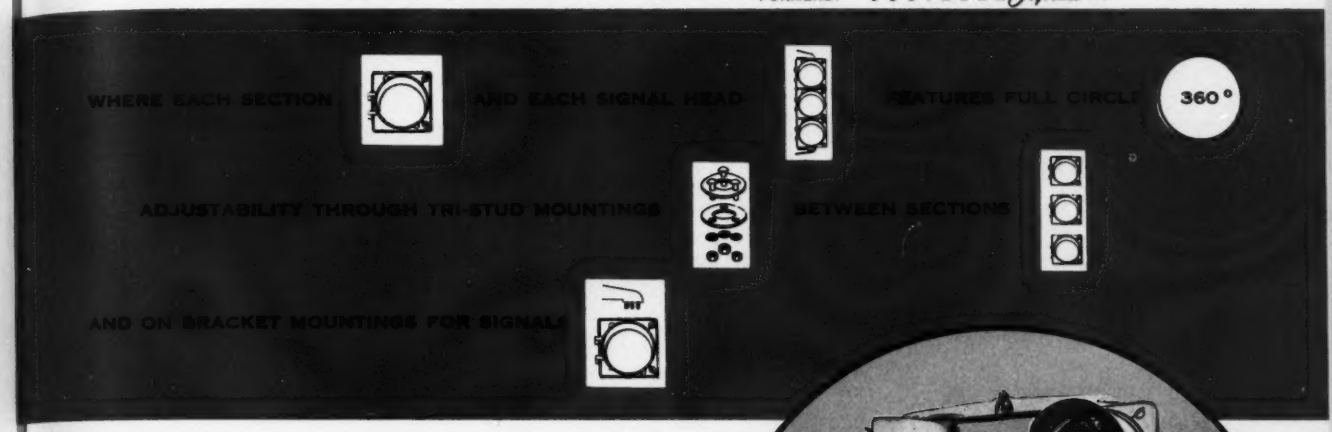
Centrally mounted on overhead bridges to cover both north and southbound traffic, cameras will point north to avoid the glare of the sun. They will be housed in weather-proof enclosures for use during inclement weather conditions and will be offset at curves for maximum visibility.

Signals, also mounted overhead, are expected to be similar to those in use on Michigan's Mackinac Bridge. Present plans call for a changeable signal to denote desired speed, green arrows

• • • if you want completely adjustable traffic signals they're manufactured by only one company • • •

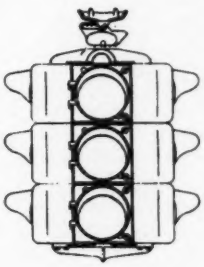
Traffic Signals, inc

FORMERLY SOUTHERN Signals INC.

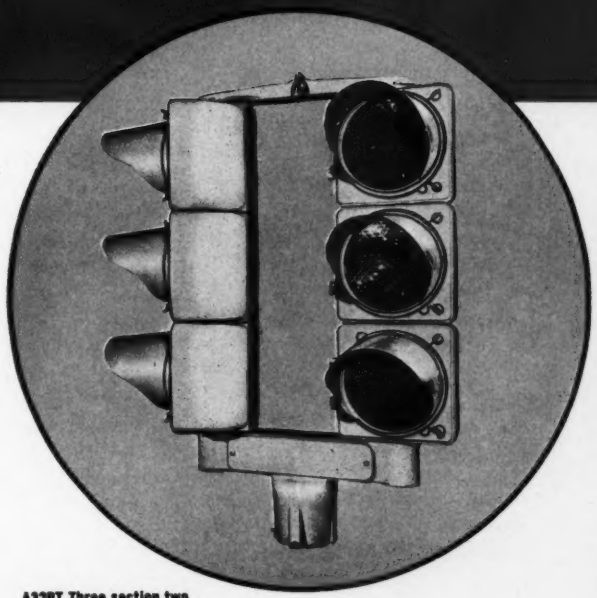


This is because tri-stud mountings do not require serrations to hold each section firmly in place and can therefore be directionally adjusted to an infinite degree.

A31PM One way three section 4" post mounting



A33SW Three section three way span wire mounting



A32PT Three section two way post mount with terminal box

TRAFFIC SIGNALS		TRAFFIC SIGNAL CONTROLS	
Adjustable	Beacons	Pretimed Controls—Isolated or Interconnected	School Crossing Controls
Fixed Face	Downlite Beacons	Actuated Controls—Semi - Full - Traffic Density	Master Controls, Console type
Lane Control	School Signals	Pressure Detectors—Directional, Non-Directional	Flashing Controls
Pedestrian Signals	Barricade Systems	Magnetic Detectors—Surface, Sub-surface	Pedestals —Signals, Controls

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to indicate open traffic lanes and a red X to indicate lanes that are closed.

The central control room not only will have TV monitor screens and a signal control board, but will include equipment to record speed and volume of vehicles and lane usage. Motion picture cameras will make permanent records of traffic behavior directly from the TV screens.

The two-year project has the strong support of John C. Mackie, Michigan State Highway Commissioner, who has designated for its use $225,000 in highway planning funds, available to the state from the federal government. Additional financing will include a $100,000 grant from the U. S. Bureau of Public Roads and $75,000 from equal contributions by the State Highway Department, Wayne County Road Commission and Detroit.

"The study will attract world-wide interest," Mackie declares. "We hope not only to provide some relief for existing overloaded expressways but to gain knowledge which will influence future expressway design, including channelization of traffic, proper spacing of access ramps and improvement of ramp design."

The section of expressway chosen for the tests carries some of the heaviest traffic volumes of any of Detroit's 19 expressway miles. It will include average weekday lane volumes of more than 2,000 vehicles, stretches of both three and four lane traffic, an S-curve, 18 entrance or exit ramps and the approaches to two interchanges.

—*Automotive Safety*

Planners Establish Journalism Award

The American Society of Planning Officials has established an award in journalism to be given annually for a significant contribution to the understanding or promotion of planning. The award will be presented for the first time at the Society's National Planning Conference in Bal Harbour, Florida, May 22 through 26, 1960.

The award may be given for a single article or news story on planning, for a series, or for a number of unrelated stories or articles published over a period of time.

The Society also gives a silver medal annually to an individual for "leadership and contribution to the advancement of planning." Awards have been made since 1949.

College Research Projects Listed by ASEE Group

Over 10,000 research projects are now underway in 118 leading engineering colleges across the nation, according to the biennial review just published by the Engineering College Research Council of the American Society for Engineering Education.

Expenditures on these research activities during the current year will total over $112,000,000 according to the figures.

Dean Kurt F. Wendt of the College of Engineering at the University of Wisconsin, who is chairman of the Engineering College Research Council, says that these figures are the largest ever compiled in the fifteen years of ECRC surveys.

"The continuing growth of basic research in our colleges of engineering is an excellent and reassuring measure of their strength and vigor," Dean Wendt said. "In addition to keeping our engineering colleges abreast of current needs and problems, this basic research will be the foundation for our nation's technological superiority in the years to come.

"By contributing new knowledge and by training students in creative thinking, basic research in colleges and universities truly serves two indispensable purposes," Dean Wendt concluded.

The 1959 survey of engineering college research gives complete titles for all projects underway in schools which hold ECRC membership; in addition, numbers of research personnel at each institution are listed, and research policies are summarized. There is a complete index of research project subjects, to help locate activities in similar fields at different institutions.

The 1959 Review of Current Research has been edited by Dr. Renato Contini, Secretary of the Engineering College, Research Council, a member of the Research Division in the New York University College of Engineering; and Paul T. Bryant, Editor of the *Journal of Engineering Education* of the American Society for Engineering Education at the University of Illinois.

Copies of the Review are available from the Secretary of the American Society for Engineering Education, University of Illinois, Urbana, Illinois, at $2.00 each.

Study Week Scheduled For Nice in September; US Group Trip Planned

The Fifth International Traffic Study Week has been announced for Nice, France from September 26 to October 1, 1960. The announcement was made by J. L. Young, Assistant Secretary-General of the World Touring and Automobile Association in London, one of the sponsoring agencies along with the International Road Federation and the Permanent International Association of Road Congresses.

Concurrently, announcement was made in this country of arrangements for a group of engineers to travel together to the meeting from the U.S. and Canada. An itinerary has been worked out which includes a tour of the Continent and three days in London after the meeting. Departure from the U.S. would be on September 25, with return on October 22. The tour would include Rome, Venice, Florence, Milan, Lucerne, Berne, Paris and London. The total cost, including air transportation, hotels, etc., is estimated at $775 to $800 per person.

Arrangements for the trip are being made by H. Bruce Murray, Associate Traffic Engineer of the City of Philadelphia, Room 1005, City Hall Annex, Philadelphia 7, Pennsylvania.

The program for the Nice meeting as announced by Mr. Young is as follows. (It is listed as "provisional" at this date, but the final program will undoubtedly be similar.)

Monday, Sept. 26 p.m.—Opening Session

Tuesday, Sept. 27 a.m.—First Working Session: "The Influence of Speed and Speed Regulation on Traffic Flow and Accidents"
p.m. — Second Working Session: "Visual Aids to Driving on Urban and Rural Roads"

Wednesday, Sept. 28 a.m. — Third Working Session: "Traffic and Parking Needs Generated by Building Development"
p.m. — Fourth Working Session: "The Problem of Capacity in Road Planning"

Thursday, Sept. 29 a.m.—Fifth Working Session: "Problems of Intersection Design"
p.m.—Free

Friday, Sept. 30 a.m.—Sixth Working Session: "Economic Losses Due to Traffic Congestion"

p.m. Seventh Working Session: "Individual and Mass Transport in Urban Areas"

Saturday, Oct. 1. a.m.—Closing Session

p.m.—Excursion

Effect of Enforcement To Be Studied by IACP

A three-year research grant from the Public Health Service of the Department of Health, Education, and Welfare, has been received by the Field Service Division of the International Association of Chiefs of Police. The grant, totaling $209,515, is for an intensive study of the impact of police enforcement on the behavior of drivers in traffic, according to Ashworth.

"Each year in the United States it is estimated that there is in excess of one hundred million dollars spent directly on traffic law enforcement," said Ray Ashworth, director of the Division, "yet very little is really known about the way or the degree to which enforcement affects driving behavior. As a result, there is very little basis for determining what enforcement methods will bring about the greatest results in efficient flow of traffic and in the reduction of accidents." Ashworth went on to say: "There are no reliable means for determining the potential accomplishments of enforcement or for making objective judgments about the amount and kind of enforcement that will produce optimum results for the money expended."

"The lack of detailed understanding of the enforcement process produces many practical problems," Ashworth said. "Legislatures and budget bureaus are repeatedly called upon to make decisions concerning amounts of money to be spent on traffic law enforcement as against other traffic supervision activities. Police administrators are faced with the need to make decisions on the deployment of manpower to get maximum results in accident reduction . . . Thus far these decisions must be made without the fullest possible information to go on." He continued: "We are confident that this grant from the Public Health Service will enable us to lay the basis for determining realistically the best enforcement techniques and the most economical applications of police manpower to our growing traffic problem."

Robert P. Shumate, director of the project and IACP Director of Research, said the specific aims of the study will be to determine: "The kinds of enforcement symbols most productive of desirable driver behavior; the kinds of driver behavior evoked by various enforcement symbols; the rate at which behavioral responses diminish; the frequency of observing enforcement symbols required for continuous desirable changes in behavior; how frequently enforcement symbols must be 'reinforced' by arrest, citation, warning, etc.; the probability that certain kinds of driving behavior will lead to accidents."

The International Association of Chiefs of Police established its Field Service Division in Washington, D.C. this year. It includes the IACP Traffic Division, which was moved to Washington from Evanston, Illinois, according to director Ashworth. "We are continuing and expanding our services to the police field in connection with motor vehicle traffic," Ashworth said, "and our program now embraces consultative services, research, training and publication in all major aspects of police administration and operations. With grants such as this one from the Division of General Medical Sciences of the National Institutes of Health, Public Health Service, we can carry on a research program that will lead us to real answers to some of our most trying policing problems."

Joint Committee Plans Revision of Sign Manual

Complete overhauling of the Manual on Uniform Traffic Control Devices, last printed in 1948 and supplemented in 1954, is being undertaken by the National Joint Committee on Uniform Traffic Control Devices. The Joint Committee, which met in Washington in January, has already issued sections dealing with expressway signs and civil defense signing, both of which sections are now in the process of approval by the parent groups.

The Joint Committee is made up of three groups of representatives from the three organizations which sponsor the Committee—the Institute of Traffic Engineers, the American Association of State Highway Officials, and the National Committee on Uniform Traffic Laws and Ordinances. The Institute delegation is headed by Wilbur S. Smith, and includes Martin E. Bruening of Milwaukee, Marble J. Hensley of Chattanooga, George W. Howie of Cincinnati, Eugene Maier of Houston, Leslie J. Sorenson of Chicago, and T. T. Wiley of New York City. A number of other Institute members serve on the delegations from AASHO and the NCUTLO.

Operations of the Joint Committee are largely through various sub-committees, such as ones on signs, on sig-

Signal Sub-Committee.

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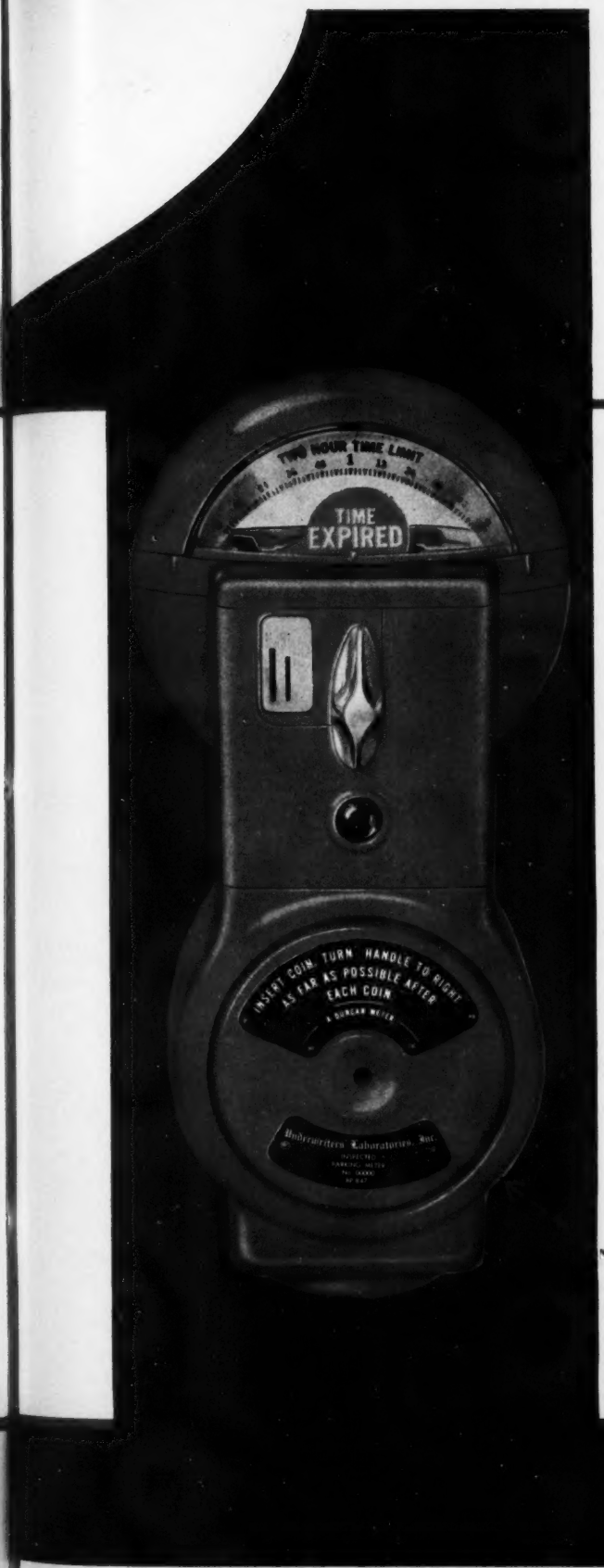

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V. I. P. EXCLUSIVE

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*Trade Mark

nals, and on pavement markings. The sub-committees have all been at work in recent months—typical has been the Sub-committee on Signals, which met in Cincinnati in December and again in Washington in January. The picture shows this group at the December meeting in Cincinnati and the good attendance is indicative of the interest which this project has aroused.

Urban Arterial Streets Called for by AMA

Establishment of a Federal-aid urban system of arterial streets was called for by the American Municipal Association at its 36th annual meeting in Denver in December.

In its resolution the Association said it favored "the enactment of legislation which would establish by law a Federal-aid urban system of arterial streets which system shall be in addition to the Federal-aid primary and Interstate systems of highways in urban areas."

The city officials said that this system should be selected by the state highway departments and appropriate local officials in cooperation with each other, subject to the approval of the Secretary of Commerce.

The group further stated:

"In making such selections, there shall be included extensions of the Federal-aid secondary system in urban areas, lateral, feeder, distributor, and such circumferential routes as may be required to furnish maximum utility to the various Federal-aid systems within or adjacent to urban areas . . .

"This system shall be confined to urban areas, except that the system may be extended into rural areas where necessary to connect with another Federal-aid system within the rural area and that Federal participation on projects on such extensions be limited to Federal-aid secondary funds.

"The proportion of the annual appropriation made by the Federal Government devoted to the construction of highways in urban areas (should) be increased substantially so as to provide for the additional funds necessary for the construction of an adequate system of urban highways."

In other action, the Association adopted a resolution, proposed by a group of mayors and railroad presidents, which said that "it is apparent" that high speed mass transportation, "particularly in the form of rail, both surface and subway, mut play a vital, important part in furnishing transportation to the great urban areas."

As part of a specific four-point program, the joint statement urged "that Federal loans be made available where necessary to municipalities or publicly constituted bodies for new commuter equipment and improved facilities and for the improvement of intracity mass passenger transportation facilities; these to be long-term, low-interest loans."

The resolution is to be recommended to the Association of American Railroads by the sponsoring group of mayors and railroad presidents.

VIII Inter-American Congress to Meet

The Honorable Charles C. Dail, Mayor of San Diego and Vice-President of the Inter-American Municipal Organization, takes pleasure in announcing that the VIII Inter-American Municipal Congress will be held in San Diego on October 16-22, 1960.

San Diego is a city of over 500,000 population located in the southwestern corner of the United States adjoining the Mexican border. Just to the south is its sister city of Tijuana, Mexico, which is sharing in the planning and preparation for the VIII Congress. The metropolis of Los Angeles is located 125 miles to the north. San Diego has a thriving aircraft industry, a busy harbor, miles of fine beaches and numerous cultural facilities among which are Balboa Park and a renowned zoological garden. The city is an important educational center of the Southwestern United States, and is gaining world recognition as a center for the development of peaceful uses of atomic energy.

One of San Diego's principal assets is a fine municipal government. In accordance with the decision reached at the VII Congress at Rio de Janeiro, San Diego will be put under the microscope, so to speak, in a case study of municipal government. The agenda of the VIII Congress focuses on the organization and functions of the municipality of San Diego and citizen participation in city government. Through the medium of papers, San Diego's institutions and practices will be described and compared with those in the United States generally, and with municipal organization and administration in Latin America. It is planned to devote one session of the Congress to a review of the council-manager form of government because of the particular interest in this subject on the part of the delegates from Latin America.

A local committee is planning a number of social events for the pleasure of the delegates and their wives and families. The tentatively scheduled events include a special event in honor of the Congress at the beautiful Agua Caliente Race Track in Tijuana, an opera, concert or ballet, and a visit to Disneyland, a Hollywood movie studio, or both.

For the information of delegates attending from North American cities, San Diego is served by frequent flights by American, Western, Pacific Southwest and United Airlines.

Traffic Increases Forecast for 60's

A decade of dramatic growth for highway transportation—a single evidence of which is the fact that divided highway mileage alone will jump from about 17,000 miles at present to 70,000 miles by 1970—is seen by Arthur C. Butler, Director of the National Highway Users Conference.

"However," Mr. Butler adds, "the next 10 years will present many problems which highway users, working together with public officials and others, can and must solve if the nation is to benefit fully from this era of progress."

"In the sixties," Mr. Butler continued, "more people are going to be driving more vehicles more miles. We conservatively anticipate a rise by 1970 from today's figure of around 575 billion vehicle miles to about 800 billion by cars, cabs and buses."

All indications, according to Mr. Butler, point to an increase in the number of motor vehicles from today's 70 million to 100 million in the next 10 years. What is more, the number of licensed drivers will have grown from 100 million this year to 120 million by the end of the decade.

In discussing some of the problems that can be seen, Mr. Butler warned that we must not allow our cities to be choked by congestion. He said that good engineering, imaginative, creative solutions to parking and other problems will permit the city dweller the privilege of choosing his preferred form of transportation.

(Continued on page 46)

New Publications

FREE

Single copies of the report "Urban Transportation Administration," published by the Yale Bureau of Highway Traffic in cooperation with the National Committee on Urban Transportation, and reviewed in this column last month, are available without charge from the office of the National Committee on Urban Transportation, 1346 Connecticut Avenue NW, Washington 6, D. C. Quantities are limited—only one to a customer—so write early.

Index to Highway Research Correlation Service Circulars

Highway Research Board, 2101 Constitution Avenue, Washington 25, D.C. November 1959. 10 pp. mimeo.

This is an index to Circulars 306 to 400, issued from December 1955 through September 1959. Circulars are classified by subject, by date of issue, and by committee activity. An earlier index of Circulars 1 to 305 is noted as being available from the Board.

Circumstances of Motor Scooter Accidents

National Safety Council, Statistics Division, 425 N. Michigan Avenue, Chicago 11, Illinois. November 1959. 8 pp. mimeo.

This is a report on fatal accidents involving motor scooters, compiled from reports of 42 states. A total of 98 fatal accidents are included. Examined in the report are such factors as age, type of accidents, location, time, light conditions, and violations of both scooter operators and operators of other vehicles involved.

Positions Available

CITY OF COLUMBUS, OHIO

Position: Assistant Traffic Engineer, to assist in the administration of the City Traffic Engineering division.

Requirements: Engineering graduate, traffic engineering experience, registration desired.

Salary: $612.00 per month. Starting salary commensurate with experience.

Apply: John L. Gallagher, Chief Traffic Engineer, City Hall Annex, 67 N. Front St., Columbus, Ohio.

CITY AND COUNTY OF DENVER, COLORADO

Position: Traffic Planning Engineer — to participate in analysis and design phase of Denver Metropolitan Traffic Survey.

Requirements: Degree in civil engineering with courses in traffic engineering plus four years' experience in civil engineering and/or traffic engineering.

Salary: $7,884 to $9,852.

Employment: For duration of one to two-year program with good possibility of continuing employment with the Traffic Engineering Section of the Public Works Department of the City and County of Denver.

Apply: Career Service Authority, Room 180, City and County Building, Denver 2, Colorado.

CITY OF WEST PALM BEACH, FLORIDA

Position: Traffic Engineer, for city of 65,000 which is growing rapidly and offers many traffic engineering challenges to a qualified man.

Requirements: Qualified in traffic engineering—specialized training and experience desirable. Able to assume duties of Traffic Engineer in City Planning Department.

Salary: Open

Apply: Send resume, specifying age, education, experience and other background information and salary requirements to: Dean S. Robinson, Personnel Director, City of West Palm Beach, City Hall, West Palm Beach, Florida.

(Continued on page 54)

The Solution to Your Parking Problems . . . Automatically
Lower Cost—Higher Revenue

Before you consider any other method of controlling off-street parking—investigate Parcoa! Make a careful comparison between Parcoa equipment and other parking controls. Note, for example, the low initial cost of Parcoa and the high costs of meters . . . Analyze maintenance problems . . . 2 gates means 2 points of service . . . 1 collection point . . . 50 meters means 50 points of service and 50 points of collection.

Parcoa permits parking to continue day and night, *smoothly*, *safely*, *quickly*, without interruptions, confusion or overcrowding.

Here is an automatic system designed by skilled engineers for operating simplicity, low first cost, low operating cost . . . an investment that actually pays for itself. Parcoa offers 100% collection . . . ease of maintenance. Hundreds of satisfied customers in industry, hospitals, schools, business and municipalities have proved the dependability and efficiency of Parcoa equipment.

Investigate Parcoa—learn the many benefits and advantages . . . It may be the solution to your parking problems, too . . . Write today for Bulletin No. 580.

FLEXIBLE OPERATION
These control types give you a choice of individual or combination of controls to fit your needs.

CODED CARD-KEY
for cars parking on monthly or reserved basis.

COIN OPERATION
for controlled transient parking.

TICKET ISSUING SYSTEM
for merchants restricted free parking service.

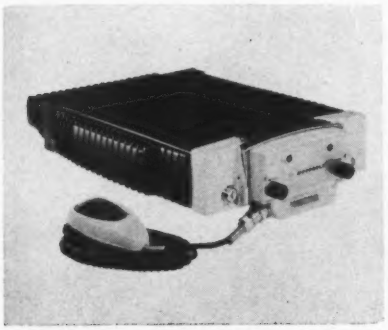
TIME-DATED TICKET DISPENSER
for automatic self service in merchant participation parking.

PARCOA DIVISION
JOHNSON FARE BOX COMPANY • Subsidiary of BOWSER, INC.
4613 North Ravenswood Ave., Chicago 40, Illinois
Telephone: LOngbeach 1-0217
DISTRICT FIELD OFFICES: NEW YORK: 420 Lexington Ave., New York 17, N.Y. CLEVELAND: 4209 W. 150th St., Cleveland 11, Ohio. SAN FRANCISCO: 468 Ninth Street, San Francisco 3, Calif. ATLANTA: 741 Boulevard N. E., Atlanta 5, Georgia.
SALES AND SERVICE OFFICES IN OTHER MAJOR CITIES LISTED UNDER BOWSER, INC.

Strictly Business

Motorola Expands Line of 2-Way Radios; Introduces Decoder

Motorola is expanding its line of Motrac two-way radios, the extensively transistorized mobile units first introduced in 1958. The expanded line will provide the highest powered transistorized equipment available. It will accommodate either positive or negative vehicular battery ground polarity and will have models for operation from either 6 or 12 volt sources.



The new line is to consist of 25 watt and 50 watt models for the low band (25-54 mc) frequencies, and 30 watt, 60 watt, and 80 watt models for the high band (144-174 mc) frequencies.

Low operating costs and highest reliability, according to the manufacturer, are provided in the new line. This is accomplished through use of transistors in all receiver and power supply circuits and in two transmitter circuits. The advantages of concepts and techniques used in the Motrac radio have been verified in scores of radio using industries.

High quality circuit boards, modules, and die cast construction are also employed throughout the Motrac radio to further reliability, compactness and ruggedness.

Contributing greatly to the lower operating cost benefits are the units' low power consumption characteristics. Even the new 80 watt unit will draw no more than .5 amp plus intermittent crystal heater drain while on standby — a minute percentage of that consumed by high powered tube units.

Low battery drain, as one advantage, enables use of the radio when the vehicle is parked, without idling the engine to keep the battery charged. This results in less gasoline consumed, less engine wear, and other cost savings.

Reliability is attained through the long life characteristics of the transistors which are solid state devices with no moving parts. Transistors have replaced the vibrators and dynamotors in the Motrac radio's power supply. Transistors have also replaced all tubes in the receiver, and a transistor is used instead of a tube in the transmitter's audio amplifier stage.

This higher reliability is reflected in lower radio maintenance costs. Motorola automatically reduces maintenance agreement rates for users of Motrac radio by at least 10 per cent compared to rates on vibrator or dynamotor powered models.

The new units are compact in size— three inches high, 13 inches wide and 17 inches long. This small size is one half the bulk of conventional tube type equipments. Housings for the new and the old Motrac radios are interchangeable.

Motrac radio chassis are die-castings to supply ruggedness, and to act as temperature conductors to transfer heat away from the semi-conductors for long transistor life. External heat radiators are used in the Motrac units to dissipate heat from the few remaining tubes and the power transistors. This technique enables a completely sealed unit, protecting components and circuitry from dirt and moisture.

Motorola has also introduced a transistorized "Quik Call" selective signaling decoder for use with its mobile two-way radios, including the Motrac radio.

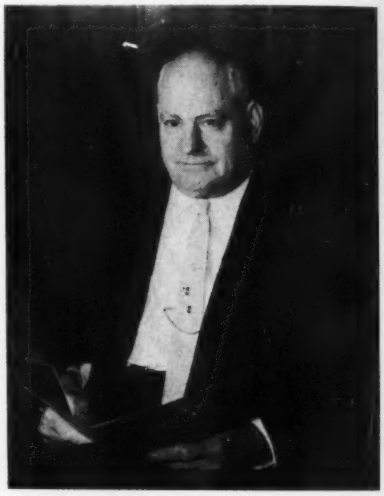
The "Quik Call" selective calling system enables a radio dispatcher to alert and talk to individual mobile units in his network without bothering other vehicle operators. When transmitting to a single mobile, the dispatcher presses a button on his "Quik Call" control console to activate and transmit a pre-set series of tone signals. These signals are received by all mobile units and fed to the "Quik Call" decoders. The decoder in the desired mobile activates its receiver's audio circuitry upon receipt of the tone code. All others remain inactive.

If the operator is working away from his vehicle, the "Quik Call" decoder can be connected to the truck horn or a light to signal the driver that he is wanted on the radio. The use of transistors in the system provides greater reliability, compactness and low battery drain.

Motorola also has expanded the capacity of its "Quik Call" signaling system. By adding two new sets of tone generating and decoding components, the number of possible code combinations has been increased to 4,300.

Traffic Signals, Inc. Headed by Pioneer Signal Executive

Traffic Signals, Inc. — formerly known as Southern Signals — which last month announced its new name, is headed by one of the best-known signal executives in the country.



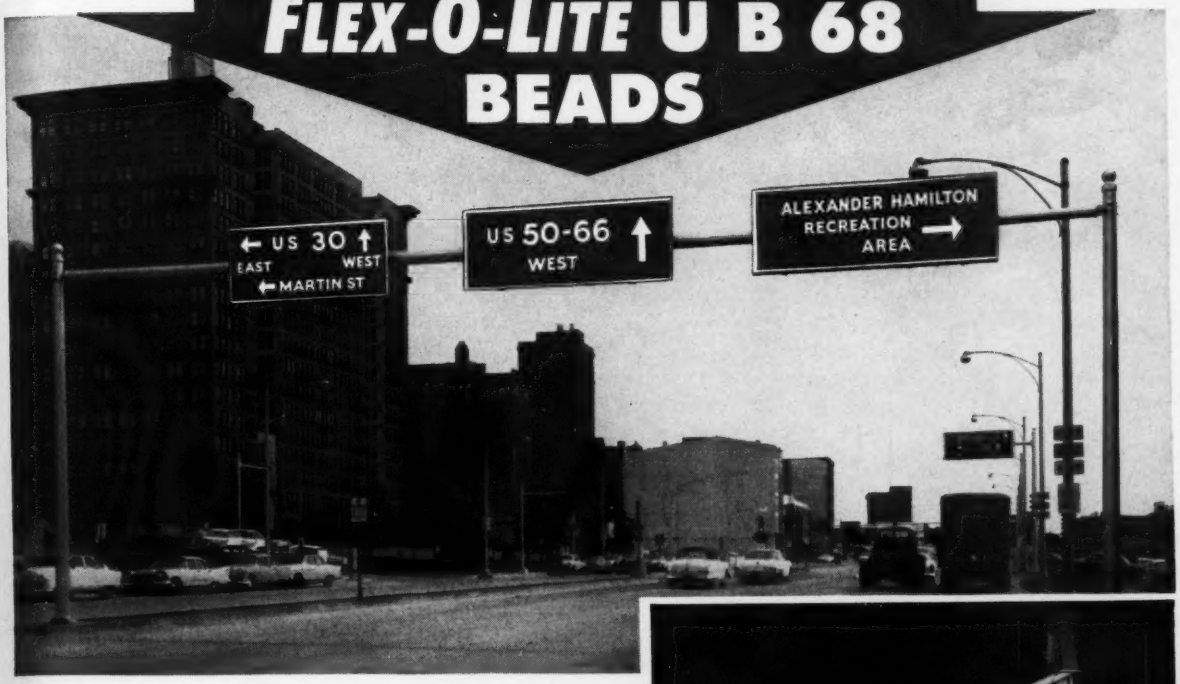
E. J. Schulenburg, President of Traffic Signals, Inc., is noted as one of the pioneers in the traffic control industry. His experience in the field dates back to 1924 when he was Chief Engineer at Harrington-Seaberg, manufacturer of traffic signals and controllers.

That company was purchased by the Gamewell Corporation in 1928 and renamed Eagle Signal Corporation. Schulenburg remained on as Chief Engineer for Eagle Signals until 1931. During this time, he designed and patented many models of traffic signals and controllers that are still in use today.

After leaving Eagle Signal, he went into the sign control and timer business first with Sangamo Electric Co., then formed his own company, Time-O-Matic, in 1945.

Now! REFLECTIVE SIGNING at its BEST for Modern High Speed Thruways

FLEX-O-LITE U B 68 BEADS

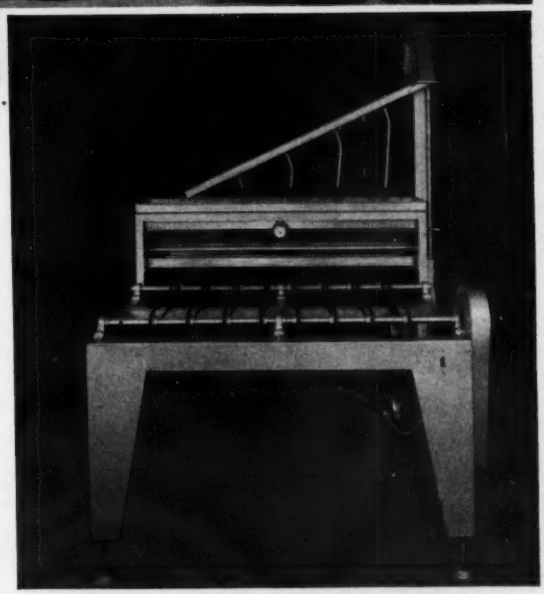


Reach New High in Performance and Safety Features

What features do you want most in your reflective sign projects? Unfailing day and night reflectorization? Chemical stability? Maximum angularity? Longer life? Ease of application? Minimum maintenance? Unquestionably you want all six, and you get them all in new Flex-O-Lite U B 68, medium index Reflective Glass Beads. Designed for 'round-the-clock protection on the nation's highways, their application to signs in the darker pigmented colors (greens, reds, blues) assures maximum reflectivity and eye-catching brilliance — for outstanding service in the cause of safety under all weather conditions.

A notable addition to the Flex-O-Lite line, U B 68 reflective glass spheres take their place as a worthy companion product to #831 High Index Beads, now the universally accepted standard for white and yellow traffic signs, street name signs and license plates.

Write for fully descriptive literature and specifications today, or use the handy coupon.



NEW! Improved Flex-O-Lite Bead Dispenser

For reflectorizing panels up to 48" wide. Ideal for application of UB 68 beads on backgrounds of large signs. Mechanical data, prices on request.

FLEX-O-LITE MANUFACTURING CORP.

8301 FLEX-O-LITE DRIVE

P. O. BOX 3066 (AFFTON BRANCH) • ST. LOUIS 23, MISSOURI

MAKERS OF DROP-ON • FREE-FLOWING • STANDARD • MILITARY MOISTURE PROOF • MEDIUM AND HIGH INDEX SIGN BEADS

Flex-O-Lite Manufacturing Corporation, 8301 Flex-O-Lite Drive P. O. Box 3066 (Affton Branch), St. Louis 23, Missouri

Please rush the following:

- ☐ Complete Data on U B 68 Reflective Beads.
- ☐ Bulletin on #831 Reflective Beads.
- ☐ Specifications on New 48" Bead Dispenser.

Name_____

Address_____

City_____ Zone_____ State_____

Computers Available In New York Area

Scientific and engineering organizations can now rent time by-the-hour on powerful International Business Machines Corp. 709 computers at Datacenters in midtown New York and Poughkeepsie, N. Y.

The more than $2,500,000 large-scale 709 system offers very rapid, low-cost processing of scientific as well as business data. The hourly rate for a standard system at both locations is $450. An off-hour rate of $315 is effective after 6:00 p.m.

Time on the Poughkeepsie center's machine is immediately available. Customers may now reserve time at the midtown New York City facility to be opened next month in the new Time & Life Building in Rockefeller Center.

The new Datacenters are the first of the six service facilities announced to date to have powerful 709 systems. IBM 7070's, data processing systems in the intermediate power range, are planned for the previously announced Datacenters.

IBM Datacenter users supply their own programmers and operators. The service facilities will be open to all businesses regardless of whether they have been IBM customers in the past.

"The 709 Datacenter offers substantial savings in time and money in processing special scientific and business problems for organizations that do not presently own or rent large computers," Gilbert E. Jones, president of IBM's Data Processing Division, said.

"Additionally, the two new Datacenters will be particularly valuable to organizations now using their own 709 systems," Mr. Jones said, "as they make available to them additional capacity during peak load periods. The new facilities also will be of great assistance to organizations planning to install a 709 or compatible IBM system."

Mr. Jones pointed out that the 709's immense speed and flexibility make it an excellent system for studies of scientific management and operations research problems. These characteristics, he added, make it ideally suited to the specific needs of scientific and engineering firms as well as research groups working on such diverse problems as bridge specifications and market analysis.

New "Air Ladder" Available

The "Air Ladder" which can be readily mounted on any truck, 1½ tons or larger, has been introduced by Root Spring Scraper Co., 527 W. North St., Kalamazoo, Michigan. It is hydraulically controlled, the hydraulic pump being powered by a 6 or 12 volt motor operating off the truck battery. No power take-off unit is involved. Platform working height is 22 feet. Safe load capacity is 500 pounds. Swing arc is 170°. Operator can control ladder from the platform.

The "Air Ladder" is a boon to cities who report numerous time saving uses for it such as maintenance of street lighting and stop and go signals, bridge painting, tree trimming, utility pole servicing, putting up and taking down street decorations, spraying insecticides and other uses. Further information is contained in Bulletin AL-26.

Demand Grows for De-icing Salt

The nation's state, county and municipal highway departments are well prepared for ice and snow removal with a record 2,200,000 tons of de-icing salt already stockpiled or on order for continuing deliveries during the winter months.

In reporting the record tonnage, the Salt Institute said that this year's orders are 10 per cent higher than last winter's and 30 per cent higher than the volume of de-icing salt used five years ago.

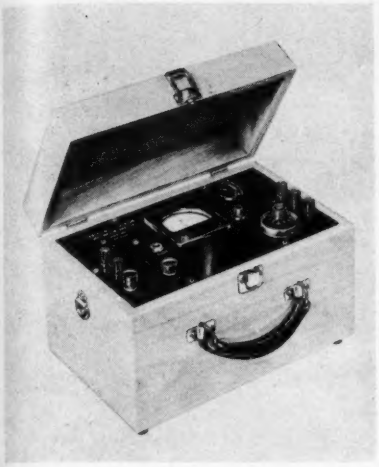
The Salt Institute attributes this season's heavy stockpiling to the adoption of bare pavement maintenance methods by a constantly growing number of street and highway authorities and also to the peculiarity of 1958-59 winter storms which set records for intensity and duration.

Storms which struck many areas in the northern tier of states around Thanksgiving time in 1958 and continued through December depleted normal reserves of de-icing salt by mid-winter. In other areas the full winter's supplies were exhausted by heavy and prolonged snows and freezing conditions which occurred during January and early February of last year. De-icing salt tonnages in many communities ran from 30 to 50 per cent higher than the year before.

The need for speed combined with economy are the practical reasons cited by highway authorities for the increased use of de-icing salt and the dwindling use of abrasives.

General Railway Signal Appoints Representative

The Electronic Control Division, General Railway Signal Company of Rochester, N. Y. has appointed Edward A. Rosenblatt and Associates of Charlotte, N. C. as representatives for their new ultra-sonic vehicle detectors in the states of North and South Carolina, Georgia, Virginia, Alabama and Tennessee. The states of Virginia and Tennessee are tentative and may be assigned later to other representatives.



Cable Fault Locator Available

The Whitney Blake Cable Fault Locator is a completely self-contained portable unit (13 pounds) which locates open conductors, shorts, grounds, high-resistance faults, crosses and split pairs in plastic, paper and rubber insulated cable. The unit operates on the bridge principle, although it differs from the common Wheatstone bridge. It is battery-operated and contains a transistorized 100 cycle tone source and a high gain tune amplifier for null detection. The null, or balance point, is attained by means of a single dial and is indicated by an easy-to-read meter. Step-by-step procedures are outlined in the operating manual and detailed drawings for each type of fault clearly show connection points. Thus, the combination of method, equipment and detailed instructions is especially suitable for use by the man who is called upon only occasionally to locate cable faults.

Daniels Firm Enters Lighting Standards Field

Daniels Standards, Inc. has been formed by Gordon E. Daniels and a group of associates to manufacture steel, aluminum and galvanized street lighting standards, traffic signal supports and other items pertaining to public, plant, and safety lighting. They will manufacture both round and octagonal shafts.

Daniels, well-known in the lighting industry, has been in active management positions in the business for about thirteen years. As Vice President and General Manager of another

A red warning sign was shown in the January issue of *Traffic Engineering* in an advertisement of Die Embossed sign manufacturers. This color was wrong—and the error was particularly grievous in view of the fact that the message in the advertisement dealt with the subject of uniformity of signs. As every traffic engineer knows, the diamond-shaped sign should have been shown as yellow.

The editors regret the mistake, which was a mechanical one, and are reproducing the advertisement on page 6 of this issue as it should have been used in January. In the meantime, we hope that no one was misled by the red color.

Again, our apologies to both the advertisers and our readers.

How much TORTURE can YOUR TRAFFIC PAINT STAND?

State Street, Chicago —one of the busiest streets in the world.

Traffic count 30,000 every 24 hours (taxicabs, buses, trucks, passenger cars.)

Painted with CLINCO-MARK to withstand heat, cold, sleet, ice, raw wind and heavy traffic. *(Furnished through INTER-AMCO.)*

A high quality paint built for

- **Longer Life**
- **Greater Visibility**
- **Lower Cost Per Dollar Per Foot**
- **Labor Savings (No need to rechalk lines when repainting—sufficient striping remains from previous marking.)**

FREE test sample. Write for yours today and descriptive literature.

The CLINTON COMPANY
Sales Representatives for Chicago Area — INTER-AMCO
1214 Elston Avenue • Chicago 22, Illinois

EAGLE

comes a NEW and much simplified solution to complex traffic problems

This new "EC" **Vehicle Supervised** System provides virtually unlimited flexibility for your complicated grids and arteries. Control of this highly flexible system is accomplished by introduction of the proper combination of vehicle detection and programming. Result of this combined control is a completely organized and automatic selection of splits, offsets and cycle lengths to meet each need as it arises, without unnecessary delay.

This NEW system also provides:

1. A complete choice of constant and variable settings with respect to cycle length.
2. Standard equipment easily and quickly converted from 2 to 3 or 4 phase operation.

Results: A highly accurate and flexible system having extreme "Built-In" Simplicity.

Simple to understand, set, check, adjust and maintain.

A TYPICAL "EC" *VEHICLE SUPERVISED* MASTER INTELLIGENTLY COMBINES TWO WELL-ACCEPTED PRINCIPLES OF CONTROL

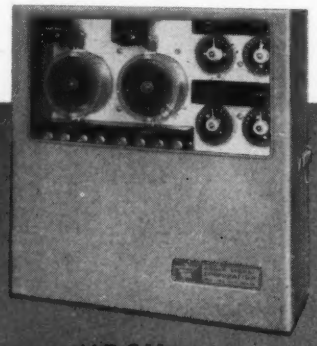
1. Vehicle detection "sampling" during "normal" traffic flow.
2. Programming for **anticipated** heavy volumes of traffic.

A MOST COMPLETE CHOICE OF SYSTEM INTERCONNECTION

1. Multi-Conductor Cable
2. Eagle Monotrol®
3. Radio

WRITE TODAY for Descriptive Bulletins!

Dept. TE-260



THE "EC" *VEHICLE SUPERVISED* LOCAL

Provides a choice of:

4 Independent Splits
4 Independent Offsets
14 Cycle Lengths (standard)

A **Minimum** of 224 "Built-In" Functions or Traffic Patterns available at the intersection.

EAGLE

Equipment Saves Lives — Saves Time

Investigate before specifying

EAGLE SIGNAL COMPANY

A Division of the Gamewell Company

MUNICIPAL SIGNALS SIGNALING ILLINOIS

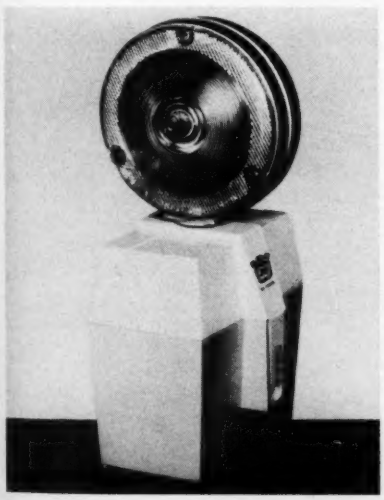
company, he has, through the years, developed improved methods of manufacturing shafts for the lighting industry. He and his associates plan to bring to the industry a new concept of manufacturing which will incorporate new methods and facilities for the manufacture of lighting standards.

The company production plant is located in Humboldt, Tennessee, and was completed in mid-December. Specially designed machines and equipment make this plant one of the most modern in industry.

The executive offices of the company are located in Suite 300, 1719 West End Building, Nashville, Tenn. Here are located the engineering, design and development, sales, advertising, administration personnel. All of these key departments are headed by men with a wealth of experience in the field.

Pacific Mercury Introduces Flasher With High Visibility

New five and seven-inch diameter flasher warning lights with a one-inch wide brilliant circle of light around the rim are being introduced by Pacific Mercury.



New Lights are available in amber and red, and have been designed to offer greater nighttime visibility and traffic safety. Flash rate of the lights is adjustable to meet specific state highway requirements, and maximum "on" time has been extended 25 to 30 per cent to meet state highway requirements now in effect in Illinois, Michigan and Nebraska.

PM's patented plug-in circuit is used in both the new models. Circuit is unconditionally guaranteed.

Lights are vapor-proof, completely safe for use in the presence of gasoline or explosive vapors. Both models are available with tamper-proof switch and PM's exclusive "Solarstat" for automatic turn-on as the sun goes down, turn-off when the sun rises. Thick, shatter-resistant, optical quality lenses and cast copper-aluminum housing drastically reduce possible collision damage, insure long service life, according to the manufacturer.

New lights are available now for immediate delivery from Pacific Mercury's marketing headquarters at 13232 Leadwell, North Hollywood, Calif.

Cataphote Newsletter Offered Free

Expanded in size and editorial content, the periodic newsletter of the Cataphote Corporation has been renamed "Reflections," states Jack E. Fagala, general manager and marketing director. The publication beams news story and picture reports of newest developments in reflective marking of streets, highways and airports, and in public support and research developments in the field of traffic safety. Persons wishing to receive the publication are invited to write Cataphote Corporation, Box 2066, Jackson, Miss.

New Appointments

Schempers Joins Auto Club Staff

Mr. William Schempers, Jr. (Jr. Mem., ITE) was recently named to the position of Traffic Engineer for the Automobile Club of Southern California. In his new position Schempers is a staff member of the Club's Engineering Department and will report to John W. McDonald, Department Manager.

Prior to his position with the Automobile Club, Schempers was an Assistant Traffic Engineer with the City of San Diego. He is a graduate of Tufts University, Class of '53, and the Yale Bureau of Highway Traffic, Class of '57.

A native of Massachusetts, Schempers now resides with his wife and daughter in the Westchester area of Los Angeles.

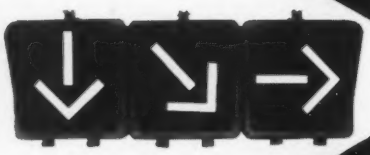
Joseph W. Guyton Joins Bartholomew Staff

Mr. Joseph W. Guyton (Jun. Mem., ITE), has recently joined the traffic engineering section of Harland Bartholomew and Associates in their St. Louis office.

Mr. Guyton was educated at the University of Illinois where he received a Bachelor of Science in Civil Engineering in 1955. Prior to returning to the University for post graduate work, he spent fourteen weeks touring fifteen western states to study highway and traffic activities as a recipient of the 1955 C. C. Wiley Travelling Award in Highway Engineering. Mr. Guyton was employed as a research assistant at the University while studying for his Master's Degree, which he received in 1957.

Since leaving the University of Illinois, Mr. Guyton has spent two years in the Corps of Engineers at the U. S. Army Engineering School, Ft. Belvoir, Virginia. He was an instructor in nuclear weapons during this time and made several special briefings in Europe as well as at various installations in the United States.

WHEREVER YOU GO



WHATEVER YOU DO

BE SURE TO SPECIFY MARBELITE

MARBELITE DWW SIGNALS AND LANE CONTROL SIGNALS FOR MINIMUM MAINTENANCE • BRIGHT CLEAR LEGEND STANDARD MOUNTINGS.

FULLY ACTUATED ELECTRONIC CONTROLLERS • MULTI DIAL CONTROLLERS • MARFLEX VISOR • LENS EXPANDER • PRESSLITE PUSH BUTTON

THE MARBELITE CO., INC.
173-179 NORTH 10th STREET
BROOKLYN 11, N.Y.
EVergreen 8-4742

Technical Notes

ALUMINUM OVERHEAD SIGN SUPPORTS

By F. G. Schlosser, Chief Engineer, Pfaff & Kendall

The most direct means of guiding and regulating highway traffic is the overhead sign. In recent years these signs have increased rapidly in size and number to keep pace with the high speeds and traffic volumes of our modern roads. Sign areas of 500 square feet are not uncommon and present specifications call for sign areas as large as 1000 square feet for single installations. These signs are held in position over the roadway by span wires, mast arms, tubular sign spans or truss type sign span structures.

Span Wire

Span wire can be installed with the lowest intital cost; however, it is not practical for sign loads larger than 80-100 square feet or spans exceeding 80-100 feet in length. In the span wire installation, the signs are attached to a cable strung between two supporting poles. Because of the high horizontal loads inherent in a catenary, the poles are usually back-guyed. Cable loads are high and motion of the signs in the wind can cause severe wear on fittings and connections. All sag cannot be eliminated and sags of less than 3 per cent subject the cables and poles to inordinately high loads. This combination of motion and high stress means frequent maintenance over the life of the installation.

Mast Arms

Mast arms are used frequently but usually as modifications of traffic signal mast arms and therefore, can satisfactorily support only small free-swinging signs. Attempts to carry fixed signs on this type of support generally have resulted in poor performance and, in some cases, structural failure. This is not the fault of the design but of the overloads imposed through wrong application of the support. To carry fixed signs of 30 square feet and larger, the mast arm should be a cantilever structure designed for the job. In addition to direct wind load the support must carry the unbalanced weight load and high torsional wind load of the cantilevered sign. The structure must be rather massive to maintain the proper rigidity under load because small angles of twist in the supporting shaft or frame produce a large deflection at the end of the arm. Even though actual stresses may be low this motion can be large enough to be alarming to the viewer.

Tubular Sign Spans

The tubular sign span consists of a horizontal tube connected at each end to vertical supporting shafts. This type of structure performs well but is limited in sign capacity and span length because of the small section modulus and low natural frequency of the span tube. A tubular sign span of aluminum (see illustration) has recently been developed which can carry 200 square feet of signs in lengths up to 50 feet. Smaller sign areas may extend this length to 60-65 feet, but beyond this point deflections under load become too large for satisfactory performance.

Figure 1
Tapered Aluminum Tubular Sign Span installed at Toll Booth Area, Hampton Roads Tunnel, Va.

The main feature of this design is that the vertical shafts not only support the structure but also act as torsion tubes to restrict the amount of bending (deflection) of the cross-beam. This is accomplished by making the cross-beam rigidly fast to the supporting shafts so that there is no relative motion between the connecting flanges. By restricting the ends of the cross-beam from rotating it approaches the loading conditions of a fixed-end beam rather than those of a pin-ended one, and so gains a reduction in center bending moment and deflection characteristic of this type of end fixity. Essentially, the supporting shaft mate-

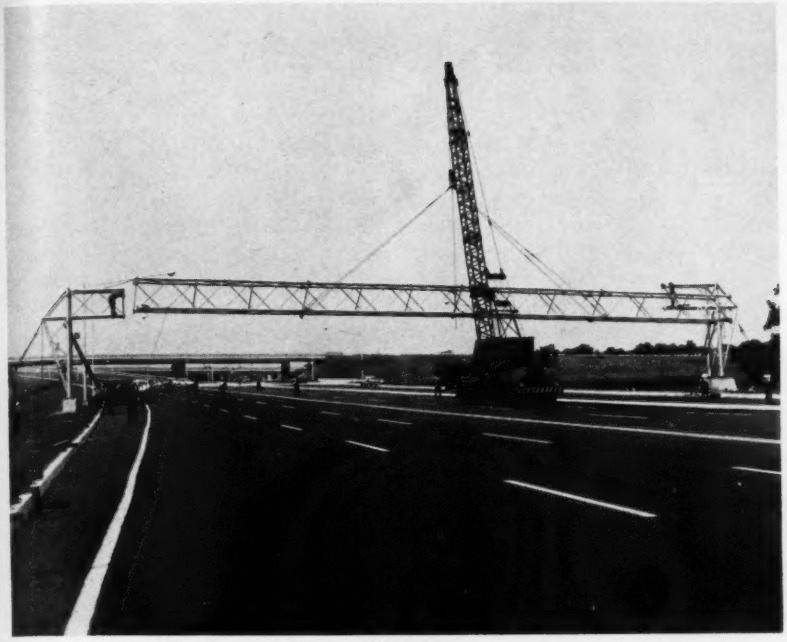


Figure 2
Assembling 120' middle section of 141'-8" Aluminum Box Truss Sign Span being installed on the New Jersey approach to the Walt Whitman Bridge. This span is designed for 700 sq. ft. of sign area and the installation impeded traffic for approximately 15 minutes.

rial is utilized more effectively so that a lighter horizontal member may be used.

The rigid connection is made by bolting flanges on the cross-beam to flanges on the vertical shafts. These flanges, which are at a 45° angle, then form a right angle joint between shafts and cross-beam when joined.

The 45° flanges assure transfer of wind and dead load reactions from the cross-beam to the shafts without eccentricity and uniformly through the complete shaft cross-section rather than through other means such as lugs and/or swivel castings which do not transfer wind load bending moment. The elimination of connecting pins removes all play from the structure, making it more rigid and less susceptible to flutter, chatter and other extraneous structural phenomena.

Transferring this additional torsional load from the bending of the cross-beam to the shafts results in a relatively small increase in the shaft stress since torsional stresses combined with bending stresses add vectorially and not directly.

Truss Type Sign Spans

The trus type sign span is the only structure presently capable of supporting sign loads of 200 square feet and larger in lengths over 100 feet. These sign spans consist of a welded tubular aluminum truss supported by a single shaft or double shaft frame at either end. The truss is light in weight and exceptionally strong and rigid because of the large section modulus characteristic of this type of construction. By way of illustration, when the middle 120 feet of the 141 foot span (see photo) was tested as a free beam and uniformly loaded with 7 tons of dead weight, its center deflection was only 2½ inches. The weight of the 120 foot truss was 5,300 pounds.

The truss may have a triangular, rectangular or square cross-section and is easily varied in size and length to suit any loading condition. Truss sections are 20-30 feet long and are bolted together to make a complete span. The supports for the larger spans are "A" frames or "H" frames consisting of two tapered shafts tied together with tubular braces so that the truss section fits between them. Because no center supports are needed, the safety hazard of a median obstruction is eliminated as is the cost of a third footing and its protective guard rail.

The complete structure is easily and quickly installed. If the supports are mounted and plumbed, and the span assembled at the side of the road, traffic need not be held up more than 15 minutes while a crane lifts the span into position and it is fastened to the frames.

Standard box truss sign spans are now available in lengths of 50 to 100 feet (5 foot increments) to carry sign areas of 100 to 600 square feet (100 square foot increments).

Although welded aluminum has been used for many years in the aircraft industry, there is still considerable reservation as to its use in the highway field. This is to be expected inasmuch as aluminum fabrication techniques are relatively new compared with

Figure 3
90' Standard Aluminum Box Truss Sign Span installed on Interstate Route 40 near Kernersville, N. C.

steel, and the structural properties of aluminum are not widely known. However, considerable impetus has been given to the use of aluminum by the Interstate Highway Program, particularly within those areas of State Highway Departments charged with the maintenance of interstate facilities. The low maintenance factor of aluminum makes its specification advantageous for signs, sign supports, bridge railing, lighting standards, guard rail and other extended-service equipment where long term cost must be considered.

A few recent highway projects requiring aluminum sign support structures have referred to a Bureau of Public Roads Memorandum entitled, "Structural Requirements for Highway Traffic Signs" dated August 11, 1959. This memorandum, while released by the Bureau of Public Roads, also represents the recommendations of the American Association of State Highway Officials.

The criteria for 6061-T6 aluminum alloy is Paper No. 970 from the Proceedings of the American Society of Civil Engineers. This paper gives a basic allowable stress in tension of 8000 psi. for welded aluminum structures.

The recommended wind loads are obtained from a wind map of the U.S., employing varying wind loads for different areas of the country much in the manner of contour lines for terrain. The loads are generally higher than the 25 psf. specified in a previous publication of the Highway Research Board (Circular 335, Committee on Traffic Control Devices, February 1958), and the 8000 psi. allowable stress is increased by a factor of 1.45, when wind loads and dead loads are combined.

The 8,000 psi. basic stress allowed in Paper 970 is quite conservative in view of the high wind load and other factors considered for any sign span design. A more realistic design is the use of a 16,000 psi. working stress coupled with a 40 psf. wind load (25 psf. on rounds). All the structures which have been built to these requirements during the past 5 years (approximately 200) are performing satisfactorily. Full static load tests before installation were successful in that no permanent set, weld cracks or other structural failures occurred.

Use of a 40-pound design wind load not only insures adequate wind load capacity in all areas of the country for this class of structure, but also prescribes a sign support that is quite rigid in normal day to day service. This assures a high period (fast damping) from the vibration standpoint, and low strains and stress levels from the fatigue standpoint.

Use of a 16,000 psi. working stress in tension (twice the 8,000 psi. specified in Paper 970 of the A.S.C.E. Part III, Section J-1) has been justified by testing and field performance. The critical area in a welded tubular connection such as the chord flanges is adjacent to the weld; however, annealing is much less than would be expected due to the nature of the operation. There are two main methods of welding aluminum; the metal-inert-gas MIG arc process, and the tungsten-inert-gas TIG arc process. Both use the inert gas-shielded arc principle wherein the weld is made within an inert gas envelope of argon or helium.

In the TIG process, the welding rod is held and fed by hand and the welding arc is struck between the aluminum and a tungsten electrode. Welds made using this method have an excellent appearance, but due to the tungsten electrode and the inherent slowness of this operation, a great deal of heat is produced. This heat causes considerable annealing and corresponding loss of strength. For this reason, Paper 970 (which is primarily a bridge specification concerned with large welds joining heavy plate and structurals) gives a distance of 3 + 3t (t = material thickness) inches for the annealed zone around a weld and specifies a working stress of 8,000 psi. for welded structures.

In the MIG process, which should be used, the welding wire is automatically fed into the welding gun from a coil and the welding arc is struck between the aluminum and the welding wire. This method is quite fast and local heating is low due to the short time required to weld the relatively thin sections being joined, and the large heat sink afforded by the tubes themselves.

Temperatures taken adjacent to the weld bead immediately after welding drop from approximately 850°F. at time zero to approximately 200° in thirty seconds. Because of the short time at high temperature and because most alloy property changes generally take place above 300°F., the temper of the material is not lowered to the fully annealed condition at this point. Beneath the weld proper, stress carrying capacity is lowered more but strength is compensated for by the increase of net section from deposition of weld material.

Many hardness readings taken on tubes before and after welding show no significant hardness drop adjacent to welds. Obviously, there is a drop in hardness, but not to the fully annealed "0" temper (8,000 psi. for 6061-0) and not for the distance 3 + 3t as given by paper 970. Tests on full size chord joints (double fillet weld all around tube) show a yield point of 24,000 + psi. which is a safety factor of 1.5 + based on 16,000 psi. Tests on chord sections with welded braces show a yield point of 30,000 psi. Tensile tests on strips cut longitudinally from a chord section with welded braces averaged 45,500 psi. ultimate; the lowest value was 35,800 psi. on a strip taken through the brace weld.

Working stress in compression is based on the maximum load given by column formulae with a minimum factor of safety of 2, but not to exceed 16,000 psi. In addition, sizes are chosen such that slenderness ratios of all braces and chords fall into the short column category. This criteria prescribes larger members than those required by paper 970, and is used for extra rigidity of the structure.

Structures designed as above (16,000 psi. working stress and 40 pound wind load) do not meet the new AASHO-BPR requirements in all cases, primarily because of the basic 8,000 psi. working stress requirement of paper 970. Aluminum materials and fabrication techniques are being penalized by this requirement in that it does not reflect the true capabilities and performance of welded aluminum structures using light wall tubing and metal-inert-gas arc welding.

Sign spans may be tested by mounting as free end beams (each end of span rests on, but is not joined to, a 12″ x 12″ timber or other suitable support) with the sign face up and applying a dead load of 40 pounds for each square foot of sign area at the location of each sign. Deflections of the unsupported span are measured before, during and after loading to check for permanent set in the structure. After testing, all welds are checked for cracks. At the same time, the span is checked for proper alignment, length, camber, and the fit of the end

sections into the supporting frames. In addition, all spans are checked continuously during fabrication for proper workmanship and compliance to drawings.

Radiographic inspection of welds can be a valuable inspection tool, but it depends a great deal on technique and interpretation. Assuming technique can be learned and good X-ray pictures obtained, one is faced with the problem of establishing criteria to accept or reject welds. Many decisions based on X-rays showing marginal quality or suspected flaws (perhaps slight porosity but no cracks) are open to criticism. For these reasons, it is best to use load tests of structures and tensile tests of welds as proof of quality and performance.

Aluminum castings of 356 alloy are used for the span flanges and for the shoe bases on the supporting shafts of the sign span. Casting design involves certain rules peculiar to castings such as generous fillets, avoidance of abrupt changes in section, proper gating of molds, etc., but basically is no different from wrought material design except that lower working stresses are used so that large strains may be avoided. For some applications, castings have a distinct advantage over weldments. The shoe base, for instance, would have to be fabricated from a heavy base plate and stiffener plates and then welded to the shaft. Generally speaking, there is more warpage and internal stress set up in weldments, and the loss of strength due to annealing from the heat of heavy welds must be compensated for by lower design stresses or heat treatment. Once the proper design stress for the casting material is determined it is simply a matter of using enough material to carry the loads.

Spans must be made in flanged sections which bolt together because of shipping and handling, and to avoid the necessity of field welding. No field welding should be allowed on aluminum unless absolutely necessary because of the difficulty in getting a good weld. Unless perfectly shielded, winds are apt to blow the inert gas envelope away from the welding arc and cause oxidation in the weld during the operation.

The load test on the span is also a test of the span section flanges inasmuch as full chord design loads are developed. Shoe base castings are designed to withstand full shaft loads and are tested to design bending moment of the shafts. This is done by bolting a base and shaft to a test stand and applying load at right angles to the shaft centerline. This testing should be done continuously with periodic redesigning in an effort to obtain the most efficient shape.

Aluminum alloy 356 should meet the specifications of the Aluminum Association. Casting properties are published by the aluminum companies and are easily verified by making tests on tensile test bars poured at the foundry from the same melt as the castings. Foundry test bars will prove that the alloy is as specified, but individual castings must be tested or otherwise checked to verify design, load carrying characteristics and quality. Inspection of this last covers porosity, surface roughness, inclusions, warpage and mold design.

Permanent mold castings are preferable to sand castings. They are finer grained and generally show physical properties 10-15 per cent better than sand castings with approximately 30 per cent ductility (per cent elongation). Ductility is very important in that it enables the casting to withstand high or repetitive loads without cracking.

Strength properties of 356 alloy casting strengths can be increased by heat treating, but there is a corresponding loss in ductility. While it is generally more economical to use heat treated castings, it is best that they be used in the "as cast" condition. While more material is used in each casting to withstand a given load, it is less brittle because there is no decrease in per cent elongation.

Tensile tests on welds and chord sections are difficult and expensive to make full size because most testing machines do not have heads which accept sizes over 3 inches in diameter, nor can they handle large size flat stock without modification.

For testing welds, one must weld test samples that are within limits of available test machine capacity. These tests are useful as a general control on quality, but the full load span test is the most reliable. Wrought material properties as received from the aluminum producers are always as specified; mill reports confirming this are available if requested, so that there is no need to verify by test.

The supporting shafts for the sign spans are tapered in diameter from bottom to top. This has a number of advantages and is done by mechanically reducing a seamless extruded tube with a modified spinning operation. The cold working imparts extra strength to the tube and material is used more economically in that the large diameter (high modulus) is at the point of greatest load and the small diameter is at the top where loads are small and where small sections are desirable for connecting purposes. Further, a tapered shaft is more pleasing to the eye than a straight one.

The span supporting shafts are usually protected by guard rail; in addition to this the footings should be raised 2 to 3 feet above grade for increased protection of the structure.

The use of catwalks or walkways on the sign bridge for inspection and maintenance of signs and illumination offers the convenience of easy access without the use of special equipment or closing of one or more traffic lanes. However, it is questionable that the infrequent maintenance and inspection justifies the cost of the catwalk, particularly when the cost of the catwalks for 5 or 6 spans of 70 to 80 feet long is sufficient to purchase a ladder truck or extendable bucket truck.

Assuming proper materials, methods and equipment are used, sound aluminum welds are dependent on the technique and experience of the individual welder. This operation is no different from any other industrial skill and must be mastered by the individual; some needing more instruction and practice than others.

In the few cases where welded aluminum did not perform as expected, it was undoubtedly due to inexperience and lack of knowledge with respect to aluminum welding, and not the fault of aluminum or aluminum welding as such. The fault for situations of this kind lies mainly in the bid method of procurement in that price alone generally governs the letting of a contract with little or no regard given to plant capacity or previous experience; the assumption being that any bidder will be able to meet the specifications. Unfortunately, this is not always true, even though every bidder is directly stating his ability to do so when he submits his bid.

Good performance must necessarily

be reflected in the cost of sales inasmuch as the expense of an engineering department, quality control department, test programs, etc. must be charged to the product. Consequently, one cannot always compete with small local operations that do not carry the overhead necessary to develop and maintain quality products and to produce them in volume.

While it may be maintained that good specifications insure a good product, the extra man hours expended and time taken from other projects by the engineering department of the buying agency so that it can properly monitor (and sometimes educate) an inexperienced or marginal fabricator can amount to a good deal more money than that saved in the bid award.

From the overall standpoint, in aluminum as in any other material, there is no substitute for experience and background; lack of it may result in higher costs because of inefficient use of material, or unsatisfactory structures because of poor design and/or fabrication. Every manufacturer should be familiar with aluminum and its properties and have a background such that he is experienced in the design of aluminum weldments, castings, and structures. He should also have a functioning quality control department and certified welders. These requirements should be part of every specification; they are necessary to insure a good product as to details, workmanship and performance over a reasonable life for the structure.

A METHOD OF ANALYZING THE VALUE OF OFF-STREET PARKING SPACE

By William Marconi, Assistant Traffic Engineer
City & County of San Francisco

After a long trial and error process, San Francisco's Division of Traffic Engineering has evolved what it believes to be a workable set of standards for judging the feasibility of off-street parking space required under San Francisco's "one-for-one" parking ordinance. The ordinance, requiring one parking space for every new or rebuilt living unit constructed in San Francisco, gave the San Francisco Department of City Planning the burden of enforcement without, however, developing any set of standards other than stating that 160 sq. ft. would be required for each parking space. When City Traffic Engineer, Ross T. Shoaf was asked for advice by the Department of City Planning, he developed a template type of analysis as the basic standard, which seems to work quite well, and allows building designers to lay out off-street parking space with a set of standards that will cover any situation.

History

San Francisco, second largest city in population in the West, is, unlike most other cities in California, a crowded city. There are 780,000 people in its 48 square miles, much of which is taken up by military reservations or park area. The usual lot frontage is 25 feet, and when it is realized that over 300,000 vehicles are registered within the city, it is evident that there is a very considerable parking problem. Considering these points, the Board of Supervisors in 1955, without much opposition, passed an ordinance requiring that one off-street parking space be provided for every new or reconstructed living unit with cooking facilities that would be built hereafter in San Francisco. The "With Cooking Facilities" clause thereby exempted hotels and motels. However, the Department of City Planning has some discretionary powers that it can apply to these types of living units. As all building permits must first be approved by the Department of City Planning, it was chosen as the enforcing agency for the "one-for-one" parking ordinance.

Early Standards

Because the Bureau of Engineering contained a Traffic Engineering Division, whose specialty, of course, was its knowledge of the automotive problem, the Bureau was soon called in to act as the consulting unit for the Department of City Planning. It was asked to judge if parking spaces provided by architects and builders were actually valid parking spaces that could and would be used by future tenants. While even very tight parking spaces can be entered by most automobiles if they are willing to spend the time and energy to maneuver into the space, it is evident that if an off-street space is too difficult to enter or has the possibility of being blocked by other vehicles, the motorist will more often than not, tend to leave his car in the street, thus defeating the purpose of the ordinance.

The first standards tentatively used by the traffic engineers, were a modified form of the parking layout shown in the Bureau of Public Roads Parking Manual. They provided for 8 x 18 foot car spaces with 24 foot aisles for right angle parking. It soon became evident that these standards were not of much use for the following reasons:

1. The standards appeared to be too strict for locations where people use the same stalls day after day. Generally speaking, the standards provided that all cars could enter the stall in one maneuver which is not really necessary for a driver who is familiar with a parking stall.

2. There are too many situations where standards such as this could not be applied; i.e., apartment houses or private dwellings with one, two, three, four or five parking spaces.

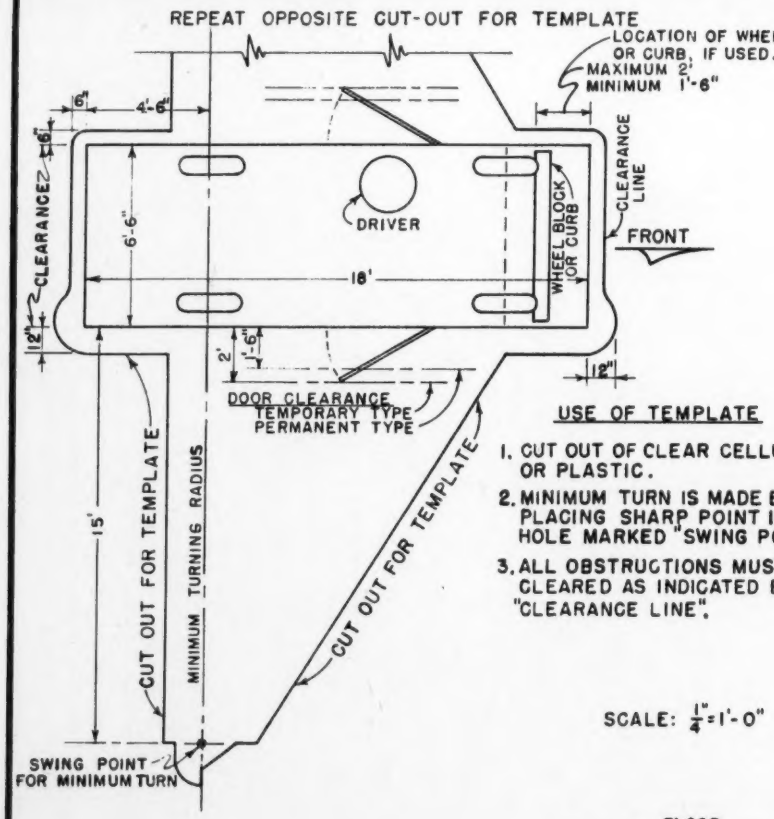
3. The standard did not take into account many factors which were of considerable importance, such as where obstructions, such as posts and pillars would be located in relation to the parking stalls. In maneuvering into a stall, a vehicle often encroaches onto the edges of the adjoining stall. The presence of a post or pole at the end of a stall will prevent this encroachment and so make maneuvering and entering the stall much more difficult.

Analysis of Stall Adequacy

After some experience with the problem, it was decided to develop a set of standards using an automobile template as the basis of analysis. The standards are shown on the accompanying illustration. The design automobile is $6\frac{1}{2}$ x 18 feet, with a 15 foot inside turning radius. These dimensions cover most of the small and medium size cars. However, the turning radius is as large as that of the larger cars.

For permanent parking, which is either apartment or home type parking, it is required that the template shown in the drawing be able to be maneuvered into each stall and that at least 50 per cent of the stalls should be able to be entered in one maneuver. (One maneuver is a direct drive into a stall without any stops involved. It may include turning of the wheels,

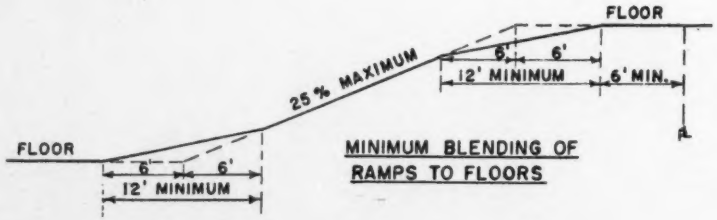
FORM No. 7936



USE OF TEMPLATE

1. CUT OUT OF CLEAR CELLULOID OR PLASTIC.
2. MINIMUM TURN IS MADE BY PLACING SHARP POINT IN HOLE MARKED "SWING POINT"
3. ALL OBSTRUCTIONS MUST BE CLEARED AS INDICATED BY "CLEARANCE LINE".

SCALE: $\frac{1}{4}$"=1'-0"



MINIMUM BLENDING OF RAMPS TO FLOORS

① TYPE OF PARKING: PERMANENT, APARTMENT & HOME TYPE PARKING
TEMPORARY, MOTEL & TRANSIENT TYPE PARKING

② ALL STALLS MUST HAVE ONE FRONT DOOR OPENING AVAILABLE AS SHOWN.

③ MINIMUM STALL WIDTHS: PERMANENT, 8'-0"; TEMPORARY, 8'-6".

④ STACKED STALLS PROHIBITED: STALLS WHICH MUST BE EMPTIED TO PROVIDE ACCESS TO OR FROM OTHER STALLS ARE NOT ACCEPTABLE

⑤ ENTRANCE & EXIT WIDTHS ⑥ MINIMUM LANE WIDTHS SHOULD NOT BE LESS THAN THAT SHOWN IN #5

NO. OF STALLS	MIN. WIDTH
3 OR LESS	8'-0"
4 - 10	9'-0"
10 - 50	10'-0"
51 OR OVER	20'-0" OR ENTR. 10' & EXIT 10'

⑦ STALLS ENTERED OVER SIDEWALK: MIN. LENGTH SHALL BE 20'-0"

⑧ CONDITIONS REQUIRING TURN AROUND SPACE
A.-BACKING ACROSS SIDEWALK, MAX. NO. OF VEHICLES PERMITTED=25
B.-MAX. BACKING DIST: 110', NO TURNS;-50', ONE OR MORE TURNS.
C.-MAX. MANEUVERS FOR TURNING AROUND. = 3

⑨ MAXIMUM NO. OF STALL MANEUVERS

TYPE	NO. MANEUVERS	% OF STALLS
PERMANENT	3 MAX. ALLOWED	20 %
	2 OR MORE	50 %
	1 OR MORE	100 %
TEMPORARY	2 MAX. ALLOWED	20 %
	1 OR MORE	100 %

NOTE: MOVEMENT FROM AISLE TO STALL CONSIDERED 1 MOVEMENT. NORMAL BACK IN MOVEMENT CONSIDERED AS 2 MANEUVERS.

⑩ BACK-IN STALLS ALLOWED

TYPE	% OF STALLS
PERMANENT	50 %
TEMPORARY	20 %

⑪ TURNS & MANEUVERS: CONTROLLED BY DESIGN FIGURE SHOWN ON TEMPLATE PLATE.

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS - BUREAU OF ENGINEERING

REQUIREMENTS for PASSENGER CAR PARKING

APPROVED	DRAWN BY / TRACED BY / CHECKED BY	DATE	FILE
CITY ENGINEER	HW	4-21-59	LL25,833

however.) The other 50 per cent may be entered in either two or three maneuvers with, however, the restriction that no more than 20 per cent of the stalls would require three maneuvers to enter (two maneuvers is the back-in type parking and requires one stop and three maneuvers is basically making two passes at a stall, and requires two stops). The clearances shown on the drawing, 6″ on the driver's side and 1 foot on the blind side, must be observed when maneuvering into a stall. It is assumed while testing any stall that all other stalls are filled.

Transient type of parking such as is found in motels and hotels is treated in the same manner as permanent parking with two exceptions.

1. All transient stalls must be 8 feet six inches rather than 8 feet in width.

2. A minimum of 80 per cent of the stalls should be able to be entered in one maneuver and the remaining 20 per cent in two maneuvers. These stricter standards are felt to be necessary since transient parkers are not as familiar with the parking act in a strange location as people who live in an apartment and who are parking there regularly.

Other Items

There are a number of supplementary points in the standards beside the basic template maneuvering that must be met:

1. When a vehicle is parked, at least one door should be able to be opened a minimum distance of 1 foot six inches.

2. No blocked stalls are allowed.

3. Minimum entrance and exit widths depending on the number of cars parked. For three or less, this is 8 feet, for four through ten, 9 feet, ten to fifty, 10 feet and fifty-one or over, 20 feet or two 10-foot exits.

4. Minimum lane widths corresponding to the entrance width standards.

5. Stalls fronting on the sidewalk have to be a minimum length of 20 feet so that larger cars will not usurp sidewalk space.

6. If over 25 vehicles are parked inside an area, a turnaround space must be provided so that numbers of vehicles will not have to back across the sidewalk. Also, a vehicle should not have to back over 110 feet after leaving the stall.

7. Maximum ramp grades are set at 25 per cent with adequate transition sections.

Conclusion

These standards seem to work quite well in San Francisco. It is possible that stricter standards might be desirable in a community with small population densities, but that, of course, is a matter to be determined by judgment and experience.

DEPARTMENT 2 REPORT

By Carlton C. Robinson, Department Head

Department 2 of the Technical Council deals with professional standards, education and administration. The interest of a professional society in these subjects is obvious. However, when viewed against the results of a recent survey (TRAFFIC ENGINEERING, November 1959) showing that ITE members spend 40 per cent of their work day on administrative tasks, it is apparent that the interest is a very direct and personal one for the members.

In the recent past, committees of Department 2 have developed informational reports on traffic engineering offerings by colleges, an expanded definition of traffic engineering for use by boards of registration, and the above mentioned membership survey. Two committees are now at work. The first of these, under the chairmanship of Ed Hall, Director, Transportation and Traffic Engineering, San Diego, is preparing a guide for Civil Service Boards on the prerequisites and examinations for city traffic engineering positions. This project is based on work of past committees which analyzed civil service requirements of the major cities and, from these, developed job specifications. The current work is reviewing these specifications and adding a recommendation for the proper areas of questioning in written examinations. This report should be available within a few months and then the committee will undertake the same job for county positions.

A second committee which was formed last September under the chairmanship of Tom Seburn, Yale Bureau of Highway Traffic, seeks to define the functions commonly performed by a city traffic engineering unit and determine proper manpower allocations to each function. This is a big job the first step of which is to question in detail a number of city traffic engineers about their duties. The committee hopes to get considerably beyond the nebulous classifications of "planning, operations, etc." and ultimately produce a guide of real value in organizing and staffing city traffic engineering units. As a point of interest, the AASHO Traffic Committee has just completed a similar project at the state level.

As with many projects, this undertaking can succeed only if the committee gets the wholehearted cooperation of the membership. Members are going to be asked for information that will take time to assemble. If they are "too busy" to cooperate, the committee will be unable to do its job.

Under the present rules of the Technical Council, a Department has three project committees, each established for one year, and a permanent Standing Committee. Department 2 is fortunate in having an eminent group as its Standing Committee: John Baerwald, University of Illinois; Edward Hall, City of San Diego; Burton Marsh, American Automobile Association; Arnold Vey, Simpson & Curtin, Consultants; and George Webb, State of California. This group determines the need for committee study projects and sets the scope of each project undertaken. They will have selected a third project for Department 2 by the time this is published. However, as each committee completes its project, another must be ready to take its place. Presently the Standing Committee is considering a number of projects. The chief ones are:

1. Preparation of a pamphlet on Traffic Engineering Careers.

2. A study of present practices in the delegation of rule-making powers to traffic engineering units.

3. A study of accident record systems and their relative effectiveness.

4. A survey of existing traffic engineering literature to determine major areas of deficiency.

5. A repeat survey of college traffic engineering offerings.

The Standing Committee wants to select those projects of greatest interest and benefit to Institute members. It can do this best if your ideas and suggestions are made known in writing and in conversation with committee members.

EDITOR'S NOTE: *This is one of a series of reports, planned to give Institute members and friends greater understanding of the work of the Technical Division. Future issues will report on other Departments.*

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Letter to the Editor

Dear Sir:

How long, sir, must we tolerate this infiltration of our (up-to-now) reputable profession by such scoundrels?! A high-level, thorough, "grass-roots," searching, objective, appropriate and immediate investigation would seem to be in order.

W. L. CARSON

(See reprint below)

Blames Engineers for Traffic Tangle

There must be a sadist or sadists at large in our midst. However, some seem to have found a few legitimate outlets for their lusts.

It seems to me that our law-enforcing agencies might be overlooking a bet in not checking on the activities of the sadistic traffic engineers, who are responsible for the routing of the westbound frustrated-but-patient motorists, who must use that perpetually unfinished avenue of terrible, tantalizing sloth, the Congress expressway.

It must surely have taken a diabolical, depraved, and fiendish mind to have devised the torture of routing the tremendous flow of rush-hour traffic into Harrison at the Lockwood exit of the never-to-be finished expressway, and the creation of one-way streets that lead into but not out of Harrison. They are all routed south, leaving the trapped motorist no avenue of escape.

W. P. MOORE

Lombard.

Reprinted from *Chicago Daily News*

TRAFFIC NEWS

(Continued from page 30)

Engineering Firm Changes its Name

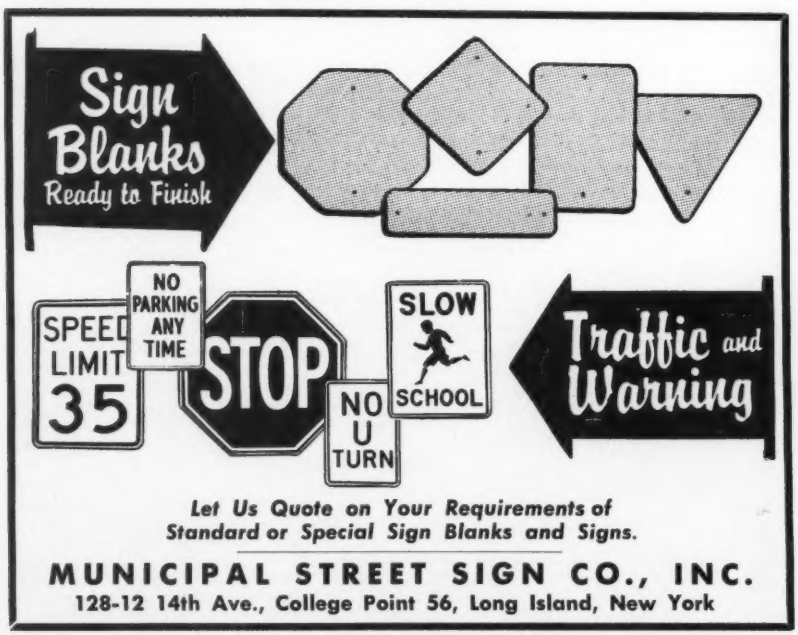
With the beginning of the new year the New York engineering firm of Parsons, Brinckerhoff, Hall & Macdonald changed its name to Parsons, Brinckerhoff, Quade & Douglas, to incorporate in the firm's title the names of two partners senior in service. There are six active partners: Maurice N. Quade, Walter S. Douglas, Alfred Hedefine, John O. Bickel, Rush F. Ziegenfelder, and William H. Bruce, Jr.

The firm, founded in 1885 by William Barclay Parsons, enters its seventy-fifth year of engineering practice next year. In the intervening three-quarters of a century many outstanding projects have been developed. Among the most widely known structures are the Garden State Parkway in New Jersey, the Hampton Roads Bridge-Tunnel Project in Virginia, and the Sunshine Skyway in Florida.

Current activities include the Bergen-Passaic Expressway in New Jersey, the second Elizabeth River Tunnel in Virginia, the 62nd Street Bridge at Pittsburgh, water supply for Newark and Akron and sewerage systems for Binghamton and Baton Rouge.

* * *

It used to be that if you saved money you were called a miser. Nowadays, if you save money you're called a wizard.



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Section News

TEXAS SECTION

Houston Area

Down at the Houston City Hall, Eugene Maier is planning a vacation and business trip right after Christmas, to the Hawaiian Islands. His Transportation and Transit Study for the City of Houston is progressing; Dave Fielder is heading this particular study. Gene says apparently no one saw his ad in the Traffic Engineering Magazine, as he still has positions open for both Senior and Junior Engineers.

Dave Fielder has turned his duties as Operations Engineer over to Harvey Hawkins.

W. F. Rich, formerly with the Electrical Division in Houston, has assumed Harvey Hawkins' duties as Traffic Signal Engineer, and Neill Amsler, former Superintendent of Signs and Marking for the City of Houston, has resigned and assumed his new duties as Parking Manager of the Hermann Professional Building and Parking Garage and Lot. This parking garage was designed by Tom Willier.

Tom Willier, after attending the ITE meeting in New York, made a jet trip with Mrs. Willier to London and Paris. Tom has been retained as a consultant for parking garage facilities by the developers of shopping centers and motels. They were gone some five weeks. Tom states that the problems in London and Paris are similar to ours; moreover, they are confronted with those problems introduced by the varying sizes of cars, all the way from small models to the oversized Rolls-Royce. In addition, Tom had the following comments to make: "In the past, people in the London area relied upon mass transportation; now, since the war, use of autos has continued to increase, and the vehicle registration has more than doubled in the past six or seven years in London and Paris where people are driving their automobiles to work. Roadways and parking facilities are inadequate. They do not have a central traffic engineering department in London or Paris. Functions are handled in the London area by several different departments of government. In Paris most of the traffic engineering work is not handled by people trained in engineering, but by civil engineering department employees in highway departments. In the London area they have parking meters; but Paris has none.

"In Paris there is a great amount of all day parking, and they have a so-called 'Blue Zone' in the central business area within which motorists may park for one to one and one-half hours free. The main reason that people are opposed to parking meters is because of their high gasoline tax. The price of gas in Paris is 80¢ (our money) a gallon, of which 70%, or 56¢ per gallon is tax. Of that tax, about 90% is being diverted and is not used for streets and highways and for traffic and parking improvements."

When asked whether or not the people are cognizant of the problem, Mr. Willier stated that there is much talk but little action. People are aware of the problem, but reluctant to attack it because of the customs and habits which prevail.

"These facts," stated Mr. Willier, "stress the conclusion that need for centralized traffic engineering departments in London and in Paris to cope with the rapidly increasing traffic volume are essential."

San Antonio Area

Dick Pena was transferred from the Traffic Section of District 15 to the Maintenance Division where he is responsible for all signal maintenance.

Corpus Christi Area

Dick Oliver reports that the Corpus Christi Harbor Bridge and expressways were successfully opened in October and that they are operating very well with the temporary expressway signing. The contract for the permanent signing was to be completed in January.

Paul Rice reports that the city is finishing five parking lots on presently unused expressway right-of-way. These lots will park some 500 cars.

Austin Area

Charlie Davis reports that the results of the 1959 state-wide rural highway speed survey have been tabulated and published by the Planning Survey Division of the Texas Highway Department. The 1959 survey made possible a direct comparison with 1958 speeds in that data were collected at identical locations, and for both years speeds were recorded by the use of a radar speed machine with an extreme effort made to camouflage the radar unit and operator.

Data were obtained from 24 stations located on major rural highway routes. Each station was operated on a weekday for an 8 hour period, 8:00 A.M. to 4:00 P.M. A few summary highlights from the 1959 survey are as follows: average speeds of all vehicles increased from 53.4 miles per hour to 54.8 miles per hour. Vehicles exceeding 35 miles per hour increased 0.3 per cent; exceeding 40 miles per hour, 1.8 per cent; exceeding 45 miles per hour, 3.8 per cent; exceeding 50 miles per hour, 8.2 per cent; exceeding 55 miles per hour, 7.3 per cent; and those exceeding 60 miles per hour increased 5.9 per cent. Passenger cars and buses show the larger per cent increase in the above 60 mile per hour bracket; passenger cars, 6.7 per cent; and buses, 24.1 per cent. 18.5 per cent of all vehicles were found to be exceeding 60 miles per hour.

Bill Welty, Frank Capshaw and John Killian (new employee and prospective member) are busy trying to fit Bill's design for Interstate Sign Mounts into the new criteria published by the Bureau. Sam Roper and Bill Dodson are still trying to get a set of Interstate Signing plans to contract. Both have been kept rather busy checking plans from the districts for submission to the Bureau. Bill Welty and Sam Roper have the job of setting up the Interstate Signing for tabulation by the electronic computer.

Joe Wright, Charlie Davis, Frank Capshaw and Bill Dodson from the Austin office attended the recent short course at A & M. All agree that the course was well worth the time. Also present were Walt Klapproth, Tommie Nuckols and Harold Beasley.

We welcome W. H. (Bill) Towery, Traffic Supervisor for the City of Austin, as an affiliate member of the Texas Section.

Dallas-Fort Worth Area

The downtown section of Fort Worth's West Freeway is nearing completion. It is hoped it will be open to the public around the first of the year. In connection with this, there will be eleven new signal installations on the service roads that are being paid for by the Highway Department. One of these is a 56 possible interval job that will be most interesting to visiting traffic engineers. The controller equipment for this intersection is mounted in three Type "M" cabinets.

On October 12, the Dallas City Council passed an ordinance controlling access to abutting property. This ordinance sets out certain design standards and requirements such as maximum width of driveway approach allowed, curb return radius required, maximum frontage allowed to be occupied by driveway approaches, number of approaches allowed for any parcel of property, separation required between driveway approaches, and, by far the most important, the banning of head-in parking on any future construction.

Dallas state and federal officials, military leaders and road builders attended a banquet at the Dallas Trade Mart on December 4. It was the first event of the dedication program for the opening of the 35 million dollar segment of Interstate Highway 35 E. It is believed that this recently completed segment of the Stemmons Freeway is the only one in the nation having 5 through-lanes in each direction separated by a 20′ median.

Amarillo-Lubbock Area

B. H. McDaniel from Lubbock reports that an inservice course is being conducted three nights a week. Sponsors are the Lubbock Traffic Engineering Department and the Texas Educational Agency. This course is primarily for the personnel of the Traffic Engineering Department. Also in attendance are personnel from the Texas Highway Department and the City Electric Department. The course is fifty hours in length, and representatives from the Crouse-Hinds Company and the Kar-Trol Signal Company have been serving as instructors for several of these meetings.

The State Highway Department anticipates starting construction on the first phase of Loop 289 sometime in the early part of 1960. This loop will be of the expressway type of construction, three lanes in each direction separated by a median divider, and will encircle the entire City of Lubbock when completed. Length is approximately 29 miles.

A local judge in Amarillo has been causing John DeShazo some concern regarding the legality of red stop signs. "We believe that we have finally won our case, at least temporarily," says John.

El Paso Area

Enrique Bustamante, formerly Assistant Traffic Engineer for El Paso, has left this office to enter private industry as of November 1. While he is still maintaining an active interest in traffic engineering, he felt it was desirable to gain a somewhat broader knowledge of civil engineering per se and is now engaged with a civil engineering consulting firm here in El Paso. His absence from this office leaves something of a void which we are quite anxious to fill.

As a result of a bond election sometime ago this office is now swamped with orders from higher up to begin the immediate installation of some seventeen new traffic signals at various locations throughout the City of El Paso, in addition to the installation of some thirty-three new intersections and the modification of some thirty-five existing intersections in the downtown area on our PR system.

WESTERN SECTION

San Diego Area

Ben Dobbins of the County of San Diego Traffic Engineering Office has accepted the position of Traffic Engineer for Riverside County, and reported on December 1.

The guest speaker for the first Area dinner meeting of the year on October 30, was Frank Hope A.I.A., a local architect who presented his proposal for a shopping mall for downtown San Diego. His presentation was well received and he stood up well under the bombardment of questions supplied by the local members and the visiting dignitaries from L. A., Downey, and Garden Grove.

Jim Reading's short course in Traffic Safety Engineering was well received throughout the San Diego area. Thirty-six people registered for the course, including five police chiefs. Jim did a great deal of work in preparation for this course, which seems to have gone over very well. The instructors, obtained from the local ITE membership, were all pleased with the results. Joe Havenner attended the first day and gave a short speech at the close which served as a good summary to the course. The real success of the course can only be measured in the resulting improvement of traffic engineering in the smaller cities of San Diego County. Benefits should be realized for years to come.

Los Angeles Area

Chairman Dick Stanford has appointed Maurice Olson chairman of the Workshop Committee. This important committee is staffed by Frank T. Shreve, Al Weber, Don Fischer and Dave Grayson.

The city is actively engaged in installing 35 new P. R. local controllers and a master controller worth approximately $120,000 for coordinating traffic on 6th, 7th and Wilshire Boulevard westerly from the Harbor Freeway to Hoover Street. In addition to the usual cable interconnect, this system boasts three radio transmitters for sampling traffic volume and transmitting program data. This project should be completed shortly after January 1st.

George Bullock, Traffic Engineer of the City of Burbank, is looking for a new assistant in his department. Jim Whitner, who formerly held this position, has accepted the Traffic Engineer's job in the City of Torrance.

George also has initiated a new street name program, utilizing porcelain enamel signs with reflectorized cut-out letters. The sign materials will cost an estimated $30,000 with the installation of the cut-out letters and the signs to be done with city forces. The city will be completely re-signed in approximately 18 months.

Ben Dobbins is the new Traffic Engineer of Riverside County. Prior to his acceptance of this position, Ben worked for San Diego County as Paul Fowler's principal assistant.

Jack Williams has been appointed Traffic Engineer of Glendale, California. Jack has been with the city for approximately 14 years, and served as Assistant Traffic Engineer under Neil Clark.

Bay Area

Because of his concern with the problem of how traffic engineers communicate with the motorist, Marty Wallen decided to study the pattern of traffic citations, and selected for detailed analysis those locations where a large number of citations were being issued per month.

In a paper presented to a dinner meeting of the Bay Area, Marty explained that he uses the citations only to find out where a problem of this type may occur. Then he conducts standard engineering studies to correct it. So far he has detected at least three types of problems: 1. the motorist is inadequately informed, as in the case of the poorly located turn prohibition signs; 2. the motorist is given such a poor alternative to a prohibited turn that he will make it anyway—this condition was found at another location and resulted in the turn prohibition being eliminated; 3. the motorist is controlled unreasonably—this was found at one location where STOP signs had been placed against the major traffic flow (they have

since been reversed), at four-way stops and on some streets where the speed limit might well be too low.

Th paper produced a lively discussion, in which it was pointed out that the method and level of enforcement may make it difficult to develop mathematical factors for citation rates. However, it was agreed that any location at which police can issue numerous citations in a short period of time deserves further study, and that traffic engineers might well arrange to have the police loan or give them copies of all citations issued for the purpose of studies such as those made in Richmond. Marty was assisted in his work by Jim Robertson and Bruno Wildermuth.

Santa Clara has approved a $21 million bond issue for capital improvements; $5.7 million of that amount is for streets, and $460,000 of that is for traffic signals.

Jim Kell presented a plaque to Bill Marconi for winning the 1959 Western Section Annual award for the best paper published in TRAFFIC ENGINEERING.

Three prospective ITE members are featured in news of personnel changes in the Bay Area: Jack Navone is now the first Traffic Engineer of San Joaquin County and is therefore regretfully relinquished to the Sacramento Area, ITE; George Beckham, Jr. succeeds Jack as Traffic Engineer of Alameda County, moving up from another engineering position on the county's staff; and Jim Robertson has been appointed Traffic Engineer of San Leandro.

Idaho Area

Lew Ross, Planning Engineer, Idaho Department of Highways, was privileged to attend a very interesting Highway Research Board Conference on Economic Analyses in Washington, D.C.

Recently, Ellis Mathes, Planning and Traffic Engineer, and Marvin Lotspeich, Traffic Engineer, Idaho Highway Department, completed meetings with states adjoining Idaho relative to Interstate highway signing problems. The series of meetings included representatives from Washington, Oregon, Utah and Montana.

Idaho has launched its fourth Urban Transportation Study in the Lewiston-Clarkston Area. This study is unique in that the steering committee is comprised of representatives from two states, two counties, two cities, and two port authorities. The three metropolitan studies currently in progress in Boise, Nampa, and Idaho Falls are approximately fifty per cent complete.

Inter-Mountain Area

Denver was the host city for the twelfth and final Freeway Operations Seminar held at the Denver Continental Hotel on November 16-18, 1959. The seminar was very successful and much credit must be given to Jack Bruce, Al Pepper, Vealess Hudspeth, Jim Brown, and John Burg, who made all the arrangements. One hundred and eleven individuals representing 20 governmental units attended, including fourteen members from the Inter-Mountain Area. Also attending the seminar was the Traffic Administrator from Havana, Cuba, Paul Rodriguez.

A breakfast meeting was held November 18, 1959, for all the Inter-Mountain Area members attending the seminar. Distinguished guests of honor at this breakfast were ITE President, Ed Wetzel; ITE Vice-President, Al Malo; ITE Executive Secretary, Dave Baldwin; and ITE District 2 Director, O. K. Normann. Skinny DeYoung and George Hill attended as Western Section members-at-large. The enjoyable meeting was emceed by Al Pepper and each of the guests addressed the group.

Jack Bruce recently had another traffic engineer visit his city. He was James Whitaker, the Traffic Engineer of Hong Kong. Mr. Whitaker also attended our Area meeting on October 23, and gave a brief description of the traffic conditions in Hong Kong.

Al Pepper participated recently in the Governor's Traffic Safety Conference at Topeka, Kansas. He keynoted the Traffic Engineering Seminar and renewed old acquaintances with Kansas ITE Members.

Ed Johnston has been promoted to Assistant Director of Highways in charge of Planning (the Planning Division includes traffic research and planning). This is a new position created by a recent reorganization.

The Salt Lake Metropolitan Transportation Study is continuing to grow and now has a staff of 18 full-time employees and 22 part-time employees. Some of the main accomplishments to date are: drafting of the base map for Davis County to the same scale as that available in Salt Lake County; counting of 375 major intersections directionally for 16 hours; completion of off-peak travel time studies on 282.15 miles of streets and peak-hour travel time studies on 53.54 miles of roadway; completion of travel time analyses on 61 per cent of the major street system during off-peak hours and on 12 per cent during the p.m. peak period; approval and printing of the dwelling unit interview schedules; selection of about 50 per cent of the sample for the dwelling unit interview phase and selection of approximately 25 per cent of the truck sample.

Arizona-New Mexico Area

Albuquerque has finally removed all of the scramble within the city. The new installations are the PR equipment with the so-called Waco system, or share-the-green sequences. The scramble system, put in originally in 1954, lasted for a little over five years.

Washington Area

This month the Washington Area welcomes a new Western Section member and the return of an old member—Don Cox and Mart Kask.

The November 18 meeting of the Washington Area was well attended. There were 18 members and 17 guests. The guests included representatives from Washington State University; State Highway Right of Way; Plans and Contracts; and Financial Divisions. We were happy to have these guests and hope they come again. Discussion of common problems from different viewpoints was beneficial and broadening for everyone involved.

Bruce Culver of the Seattle Traffic Engineers' Staff reported on the New York Convention and led a discussion on the preliminary draft of the Manual for Programming and Conduct of Local Area Meetings. Gene Ireland, State Highway Department Lighting Engineer, was appointed Insurance Committee Representative. The rating of "Fellow" was discussed at the request of Myron Mitchell, Senior Engineer of the Bridge and Geometric Design Division of the Seattle Engineering Department. Ed Horwood, Associate Professor of Civil Engineering at the University of Washington, discussed with finesse land use development around freeway approaches and interchanges, the effect of this development on highway usage, and the beneficial results of continuous frontage roads on developed or potentially developable areas in preserving the usefulness of throughways for through traffic. This discussion was well illustrated with colored slides of examples taken along the East Valley Freeway in Spokane, the freeway right of way in Denver and the Rio Grande Valley Freeway near El Paso. Professor Horwood is attempting to document what is happening in land use development near freeways for the benefit of planners and highway engineers.

A lively discussion from the floor followed. Points of considerable interest were those concerning who should pay for frontage roads, the demands by industry and commerce for sites near the freeways, and the reasons for this demand.

The regular meeting dates scheduled for next year are Thursday, January 21; Tuesday, March 15; and Wednesday, May 18. The subjects of the technical programs will be announced later.

Oregon Area

Further honors have been bestowed upon an already esteemed member of the Western Section. At their recent annual meeting in Portland, Fred T. Fowler, Highway Engineer Coordinator for the City of Portland, was made a Life Member of the Professional Engineers of Oregon. Also honored was a gentleman who has been closely associated with the Oregon Area. G. W. Holcomb, head of the Civil Engineering Department at Oregon State College, was selected Engineer of the Year for the State of Oregon. The Oregon Area extends its sincere congratulations to the two gentlemen.

As a result of the Urban Transportation Study to be conducted in the Portland Urban Area, the Planning Survey Section of the Oregon State Traffic Division has expanded into four units. An Urban Studies unit has been added to the existing Economic Analysis, Road Inventory and Mapping, and Traffic Survey units. Jay Blair is to head the new unit.

Through the joint efforts of J. Al Head and Martin P. Coopey, the Northwest Traffic Engineering Conference and the Road Building Conference are to be combined under the title of The Northwest Highway Engineering Conference. The Steering Committee composed of representatives from the Oregon State Highway Department, the Regional Office of the Bureau of Public Roads, Oregon State College, Oregon Cities and Counties, and the Western Section of the ITE met on November 4, in Salem and prepared the agenda. J. Al Head represented the Oregon State Highway Department and Dennis Peterson and Bob Conklin represented the ITE. The dates of March 23-25 were set for the conference which is to be held at Oregon State College in Corvallis. All Western Section members should plan to attend. Additional information concerning the conference will be mailed to all members at a later date.

MISSOURI VALLEY SECTION

Excerpts from Meeting Minutes

The quarterly meeting of the Missouri Valley Section was held December 4, 1959. Section President Ellis C. Henry, Jr. presided and 41 other members and guests were present.

Our host, Jack Falin, welcomed the group to Kansas City and expressed the desire that we would have an enjoyable visit. He then escorted the group to the roof of the City Hall Building from which the Kansas City Metropolitan area could be viewed. Particular attention was focused upon the development of a system of Expressways, which were readily visible from the rooftop.

Daniel J. Hanson was unanimously elected to the office of Secretary-Treasurer for the remainder of the 1959-60 year, to fill the vacancy created when Adrian Koert moved on to Washington, D.C. to accept a position

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The group commended Keith W. Graham for a job well-done in the publication of the *Movite Journal*. The first issue of this official newspaper of the Missouri Valley Section was mailed to the membership in November.

The Central States Safety Conference will be held on March 16-18, 1960, at the Chase Hotel in St. Louis. It was suggested that a Traffic Forum, sponsored by our group, might be held in conjunction with this meeting. All members of the group should give some thought to this matter. (The date for the Traffic Session has been set for Thursday, March 17, 1960.)

We were honored to have two distinguished guests attend our meeting, Messrs. Gordon G. Lindquist and Evan E. Olmstead, both of Chicago, Illinois. Mr. Lindquist is Assistant Director of the Traffic & Safety Dept., Chicago Motor Club and President-Elect of the Midwest Section. Mr. Olmstead, Traffic Engineer for the Chicago Transit Authority, is the newly-elected District 4 member of the Board of Directors of the Institute.

Mr. Henry asked for the sentiments of the group pertaining to the recommendations relating to Membership Qualifications and Redistricting, which were included in the ITE Highland Park Workshop Proposals. President Henry was authorized to make a report to Mr. Sielski, informing him as to the feelings of the group toward these recommendations.

Mr. Norman Barnett who spoke to the group regarding the Iowa Roads Study was introduced. The purpose of the study is to determine the proper distribution of the Road Use Tax Fund between the municipalities, counties, and state. The State Legislature appointed a committee to direct the study. They, in turn, employed the services of the Automotive Safety Foundation and the Public Administration Service and charged them with the responsibility of conducting the survey. Mr. Barnett's report explained in detail Sioux City's part in the Iowa Roads Study.

FLORIDA SECTION

The Institute of Traffic Engineers gained a new section late in 1959 when Florida members of the Institute joined together to form their own organization.

Early in July of last year, 15 of the 29 Institute members within the State met at Miami Beach to discuss the pros and cons of forming a Florida Chapter or separate section. A poll of all 29 members had previously indicated a majority opinion in favor of forming the new section.

As a result of this meeting, a Charter Committee was appointed to draft a petition for approval of the Institute Board of Direction.

Subsequently, the petition, containing 23 signatures, was approved by the Board at the Annual Meeting in New York during September, and at an October meeting the Florida members drew up a proposed Constitution and set of By-Laws which was later endorsed by a vote of the Florida membership.

The adopted rules of government are similar to the Midwest model which was developed during the recent ITE Workshop, and one of its highlights is the inclusion of a special membership grade termed Provisional Member.

This category of membership was established for those persons actively engaged in traffic engineering at a professional level

(Continued on page 54)

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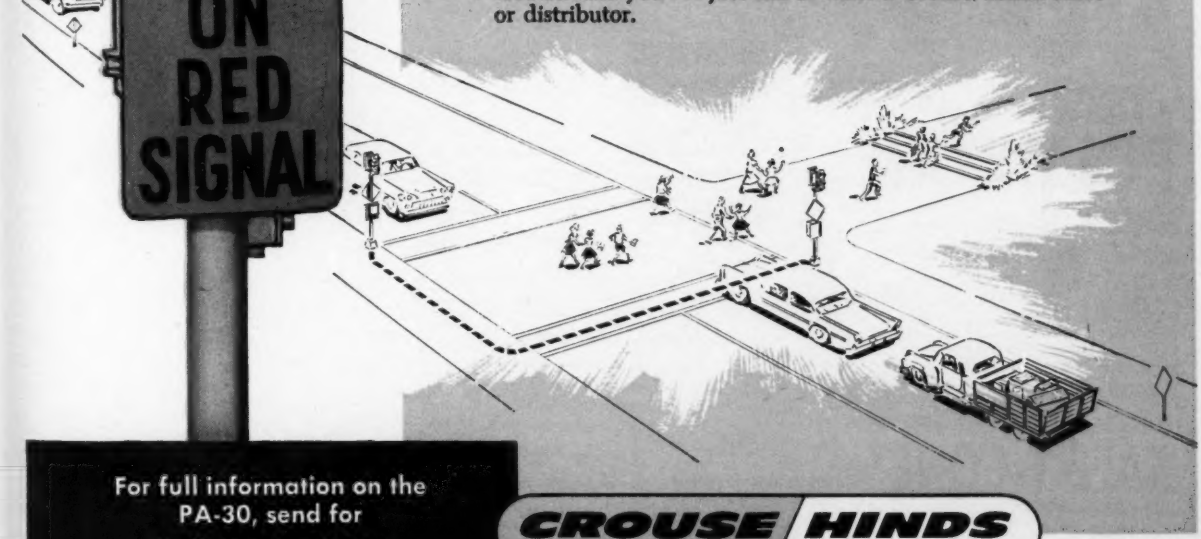

For full information on the PA-30, send for Bulletin No. 2716

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but not yet meeting the requirements for Institute membership.

The underlying feeling which instigated the formation of a separate Section in Florida, formerly part of the Southern Section, was that the increase and promotion of traffic engineering within the state could be better served by an independent section. Additionally, there was growing feeling that Institute activity of Florida members of the Southern Section was not growing properly largely because of geographical disadvantages, district travel required to attend Section meetings, etc.

The First Annual Meeting of the Section was held in Orlando on December 4, 1959. Officers elected to serve during 1960 are:

E. A. Mueller, President; G. H. Kunde, Vice-President; J. W. Barr, Secretary-Treasurer; S. H. Hiller and H. P. Boggs, Directors.

A technical program of speakers and panel discussions was held covering the aspects of traffic engineering from the State, County, City, and consulting engineers' viewpoints. Speakers were: Walter Ducker, City Traffic Engineer of St. Petersburg; George Kunde, Metropolitan Dade County Traffic Engineer; M. A. Conner, State Engineer of Traffic and Planning; and Fred Bell, Traffic Engineering Consultant.

The Section's next meeting will be held in conjunction with the Southern Safety Conference at Jacksonville, Florida during early March.

Traffic Engineering Center—Dispatcher relays reports on defective traffic control to mobile repair crew.

POSITIONS AVAILABLE

(Continued from page 31)

PITTSBURGH AREA TRANSPORTATION STUDY

Position: Chief Traffic Engineer.
Requirements: Responsible for evaluating existing transportation facilities and supervising the traffic assignment-facility planning analytical processes. Should be generally familiar with origin-destination surveys. Knowledge of public transportation operations or planning is beneficial.
Salary: $8,163 to $9,011.
Apply: Pittsburgh Area Transportation Study, 14 Wood Street, Pittsburgh 22, Pennsylvania.

JACKSON, MICHIGAN

Position: Traffic Engineer—to act as assistant to the City Engineer and to perform work of more than average responsibility in the Traffic Division.
Requirements: Graduate of an accredited engineering school and some experience in traffic engineering.
Salary: $6,630 to $7,644. Regular increases, excellent fringe benefits.
Apply: Personnel Director, Room 205, City Hall, Jackson, Michigan.

CITY OF DULUTH, MINNESOTA

Position: Traffic Engineer, to direct City Traffic Engineering Bureau.
Requirements: Knowledge of principles and practices of engineering, with specialized knowledge of modern traffic engineering. B. S. in engineering from accredited college, with some specialized training in traffic preferred, plus two years of responsible experience in traffic engineering.
Salary: $7,392 to $8,988, plus health and life insurance benefits.
Apply: Civil Service Board, Room 407 City Hall, Duluth, Minnesota.

TRAFFIC SAFETY

(Continued from page 19)

travel from the Central Business District into Wisconsin by two diverging routes in limited-access traffic ways. The Northwest Expressway will be doubly unique: It will have rapid transit service, and two isolated traffic lanes designed for reversible operation.

Six and a half miles of Congress Expressway, extending westward from the Loop, have been open to traffic since 1956. A two-mile section needed to close the gap between city and suburban sections of the expressway is also scheduled for completion late in the summer of this year. Congress Expressway is the first traffic facility of its type in which rapid transit service is provided. High speed trains operating on tracks in the center mall bring passengers from western suburbs into the Loop.

Recent studies conducted by the Chicago Area Transportation Study show that Congress Expressway is five times safer than conventional arterial streets in the city. Accident rate on the expressway is 2.8 accidents per million vehicle miles as compared with an average of 14.3 accidents per million miles on the arterial street system. The study shows that one mile of expressway carrying 100,000 vehicles per day saves motorists 389 accidents per year at a cost of $160,000.

Among other activities that contributed to the success of Chicago's traffic safety program are strengthening of the state driver licensing laws and adoption of a point system to facilitate discretionary suspensions of driver licenses by the Secretary of State. Plans are being drafted by the Chicago Board of Education to extend driver training to four high schools under provisions of a state law calling for compensation per each student trained out of state funds.

Casualty insurers doing business in Illinois recently announced reduction in rates on automobile insurance. In some instances, the decreases in rates for Chicago were greater than for the state as a whole. Reasons given for the decreases are fewer accidents and less damage per accident. Inasmuch as insurance rates have climbed steadily since 1945, the announced decreases are a good indication that the tide has turned.

CITY OF RICHMOND, CALIFORNIA

Position: Associate Traffic Engineer, to be concerned primarily with planning, geometric design, and some work on signals. Almost no work in traffic operations, which is performed at the technician level.
Requirements: Completion of graduate work in traffic engineering, plus at least one year of professional experience.
Salary: To $715 per month to start, plus fringe benefits.
Apply: Send resume to Martin Wallen, Traffic Engineer, Department of Public Works, City Hall, Richmond, Calif.

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For additional savings, look at those projects you have wanted to start but, perhaps, put off because you thought they might be too costly. Projects like new reflective street name signs, hazard markers—distinctive trailblazers and guide signs that direct motorists day and night for city parkways or county roads. Faces for these signs can be made to order for you at lower cost than you think. All you have to do is apply the face to your sign blank in your applicator. Takes only five minutes.

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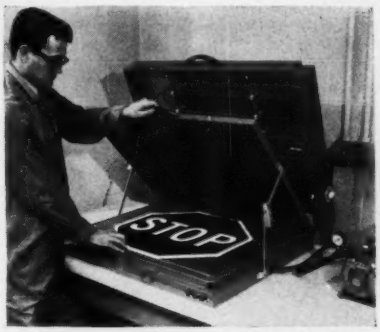

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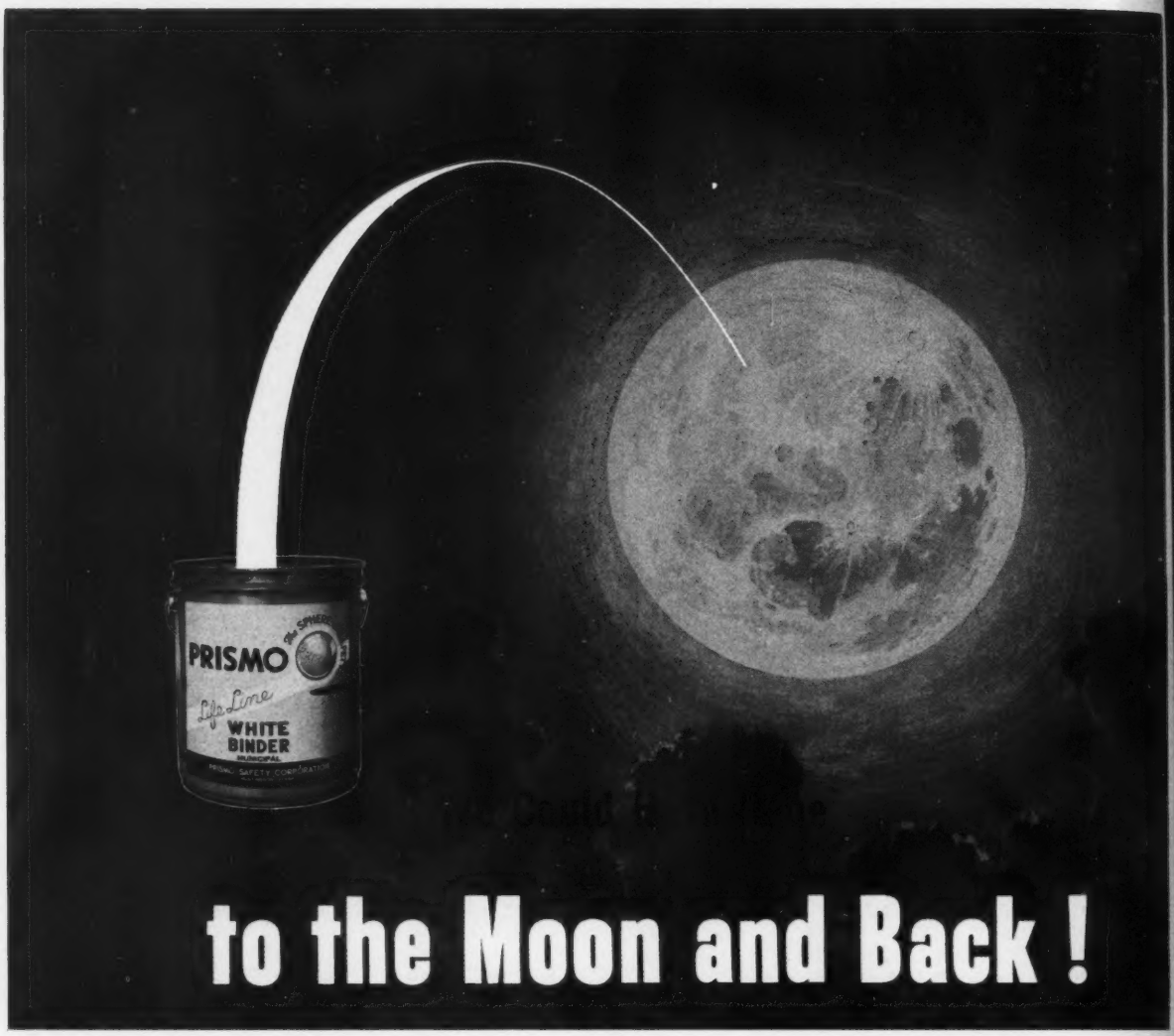

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